



**Tanglewood Biodiversity and Human Settlement Feasibility Study 2020: A Report Prepared for Tweed Shire Council**

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# A Report Prepared for Tweed Shire Council

## Tanglewood Biodiversity and Human Settlement Feasibility Study 2020

Authored by Ned Wales, Lindis Flessen and other Bond University Students

### Executive Summary

This report explores development feasibility for the property at Tanglewood, near Cabarita Beach, on New South Wales, far north coast. This preliminary investigation provides a draft land use development vision to strike a balance between biodiversity conservation values such as koala habitat to coexist with human settlement. The Tanglewood site is of interest due to the need to accommodate a rapidly growing population<sup>1</sup> according the North Coast Regional Plan 2036<sup>2</sup>. At the same time there is a deep concern for the future of koala populations in this region, where this site an opportunity to avoid potential extinction of koalas and other native flora and fauna<sup>3</sup>.

The Tanglewood site has an area of just under 330 hectares with land use zoning that is outdated and reflective of a master plan proposal drafted in 1983. Nearly 40 years on, land use patterns and environmental management objectives are more sophisticated, where the impacts of a rapidly changing climate is more apparent. In the following proposals the opportunities and constraints of the site have been deeply considered in order to achieve a more balanced outcome for increased profit and compliance with sustainable development practices.

There are several constraints on this site that impact the financial value of the land as a broadacre housing development. These constraints must be considered as they are seen by traditional development practices as obstacles and thus have held back this development site over the past four decades. The current asking price is over 20 million dollars but after intensive site investigation, the actual land value price point needs to be reconsidered in light of a number of major hurdles such as basic infrastructure provision, noise from the motorway, rezoning of the land, flood hazard amongst others.

A preliminary investigation of the Tweed Shire Council Planning and Flooding map<sup>4</sup> shows overlay mapping of extensive flood zones, bush fire risk and protected koala habitat. These and several other constraints have been a challenging component on the urban design of a development in this draft master plan proposal. The property was originally listed at \$30 million and recently dropped to \$26 million. Following research of comparative properties, it shows the current asking price is not

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<sup>1</sup> Tweed.nsw.gov.au. (2018). *Major Developments*. Retrieved from: <https://www.tweed.nsw.gov.au/MajorDevelopments> [03/03/2020].

<sup>2</sup> North Coast Regional Plan 2036. New South Wales Department of Planning and Environment, Crown Copyright 2017 NSW Government.

<sup>3</sup> Tweed Shire Council. (2015). *Tweed Coast Comprehensive Koala Plan of Management*. Retrieved from: [file:///C:/Users/bruker/Downloads/TSC05969 Tweed Coast Comprehensive Koala Plan of Management January 2015 %20\(2\).pdf](file:///C:/Users/bruker/Downloads/TSC05969%20Tweed%20Coast%20Comprehensive%20Koala%20Plan%20of%20Management%20January%202015.pdf) [21.02.2020].

<sup>4</sup> Tweed Shire Council. (n.d.). *Planning and Flooding map*. Retrieved from: <http://tweedsc.maps.arcgis.com/apps/webappviewer/index.html?id=03d7ae8030d6493c873bf49e0b0258ee> [21.02.2020].

realistic. Further professional certified evaluations of the site such as valuation and offsetting potential, need to be undertaken with consideration to fully explore the highest and best use of the site.

As this report was written, local property markets have a sound outlook, with strong infrastructure growth, with further interest rate cuts and loosening demand on lending criteria, the sale of residential properties is increasing in value over the long term.

A draft master plan from Bond University has been explored here to show how innovative development opportunities can be realised at Tanglewood, including residential and commercial zones, as well as large areas for native species conservation and lucrative environmental offsetting.

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## 1. Introduction

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The Tanglewood Estate is a site located in far northern New South Wales in Tweed Shire and covers approximately 321 hectares. The following detailed information cover potential land development opportunities. The following draft master plan proposal will need further investigation before finalising any development proposal. This report undertakes a site analysis to help inform decision makers on the best built and natural environment outcomes are best suited to the area. The report will include examples of economic development feasibility, development cost and market research on potential residential development outcomes. The overarching object of this work is to provide innovative ideas that explore sound ecological and economic investment.

## 2. Site and Demographic Analysis

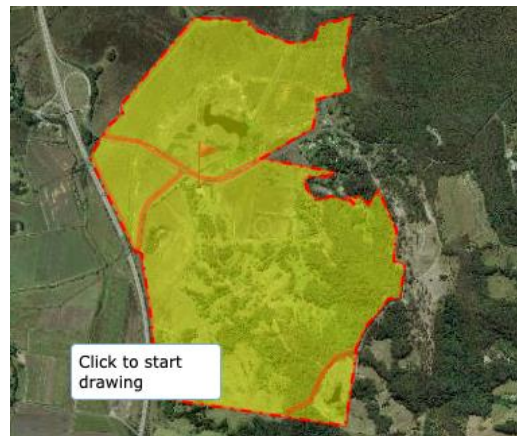
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### 2.1. SITE ANALYSIS

#### 2.1.1. Physical Data

##### 2.1.1.1. Location

The Tanglewood estate is located within Tweed Shire; 18 kilometres from the Queensland border in the northern rivers area of New South Wales. The closest town is Cabarita Beach, with a permanent population of approximately 3,000 residents. The property covers a total area of 321.7 ha (**Fig. 1**). “The land is bounded by the M1 Motorway to the west, is 20km south of the Gold Coast and 45km north of Byron Bay which are two of Australia’s premier tourism and holiday destinations.” (Canford Property Group, 2017).



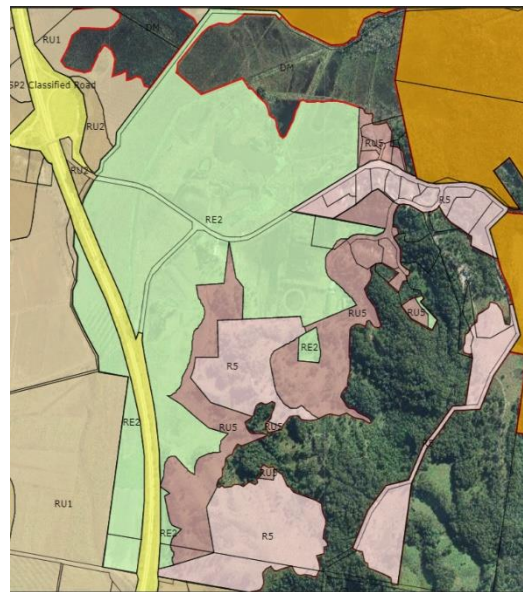
**Fig. 1:** Proposed site (SIX Maps 2019)

#### 2.1.1.2. Current Land Use

The current planning of the site represents a variety of land zones including private recreation, village and large lot residential as detailed in Tweed Shire Council's, Local Environment Plans (**Fig. 2**). The current use of the site is horse and cattle agistment. A portion of the site was previously used as an equestrian training venue for international jockeys and dressage horses. In the early 1980s, the original developer subdivide a handful of lots, provided power and roadways, where the remnants of these efforts are still evident today.

#### 2.1.1.3. Climate

The climate in the Cabarita Beach and Tanglewood area is subtropical with hot and humid summers. The summer months see average highs of 29 degrees and average lows of 20 degrees, with humidity between 75 and 85. The winter months see an average high of 21 degrees and an average low of 9 degrees, with humidity sitting between 65 and 75 between 9 am and 3 pm (NOAA, 2019).



**Fig. 2: Land Zoning (LZN 2014)**

In the past, due to the subtropical climate, the summer months average twelve days of rain per month, with the winter months averaging five. Through the summer months, the higher humidity is due to the hot winds from the north. The easterly sea breeze lowers the overall temperature. In winter, the southerly breeze creates a much cooler climate than in summer. Climatic conditions are highlighted here to emphasise benefit in the application of "Subtropical Design Principles" (Kennedy, 2010). Due to the locality and topography of the subject site, much of the easterly breeze in summer may be nullified, making the estate marginally warmer than the coastal town of Cabarita Beach.

#### 2.1.1.4. Acoustics

This site has an unusual mixture of natural serenity and constant highway noise which makes it a complex acoustic environment. On the one hand, you will hear the natural sounds of birds, insects and mammals such as koalas. Whereas the sound of cars, motorbikes and trucks is audible as they pass up and down the neighbouring Pacific Motorway.

### 2.1.2. Environmental Data

#### 2.1.2.1. Vegetation

Within the sub-tropical Tanglewood bioregion, there are 202 (108 endangered) flora species and 157 (36 endangered) fauna species. Flora species include the black and white booyong, Australian cedar, the small-fruited grey gum and the Sydney blue sky gum. The dominant fauna type in the region is birds, many of which are endemic. Typical species seen in the area include Corella birds, Coxen's fig-parrot, rainbow lorikeet amongst other Australian natives. There are environmental restrictions on the removal of flora due to koala protection measures.

### 2.1.3. Cultural Data

#### 2.1.3.1. Site Structure

The subject property is made up of three land parcels. The area on the northern side of Clothiers Creek Road is primarily low-lying marshland with a body of water centrally located and is zoned as private recreation. The smallest parcel of land to the north-west is low-lying land, also zoned as private recreation. The main plot of land has a ridge running through the middle, with dense vegetation dominating above the flood plain.

#### 2.1.3.2. Infrastructure

The site is located just off the Pacific Motorway, which provides quick and easy access to amenities found on Gold Coast, Byron Bay and the international airport. Locally, the property is situated off Clothiers Creek Road which provides one lane access in both directions. On the western border of the land lies Watty Bishop Road, which is less developed and would require upgrading to handle a significant increase in traffic.

The site is not serviced by public transport, with the closest bus facilities four kilometres away in the coastal village of Cabarita. For example, to reach Broadbeach on the Gold Coast, you would need to walk or drive to Cabarita, then catch a public bus to Tweed Heads, then change to a Gold Coast bus to Broadbeach which requires 2 hours in travel time. This means that future development at Tanglewood will be car dependant in the early stages.

#### 2.1.3.3. Cultural and Community

A cultural heritage survey has yet to be undertaken by the Tweed Byron Aboriginal Land Council. The history of this part of the northern rivers area dates back many thousands of years. Artefacts and places of cultural significance are common in Australian coastal regions.

In more recent history the surrounding countryside was cleared for agricultural production of sugar cane and cattle grazing. The neighbouring villages of Bogangar and Cabarita Beach were mostly a cluster of fishing huts until the 1990's when growing popularity of the Tweed Coast gained momentum. The area has seen significant population growth since the early 2000s. There is a higher proportion of people attracted to the beach and surf culture as well as a predominance of young families with middle class incomes and some representation of people at retirement age. Increased housing demand is leading to higher density development on the coast and pushing housing pressure into the hinterland areas such as Tanglewood.

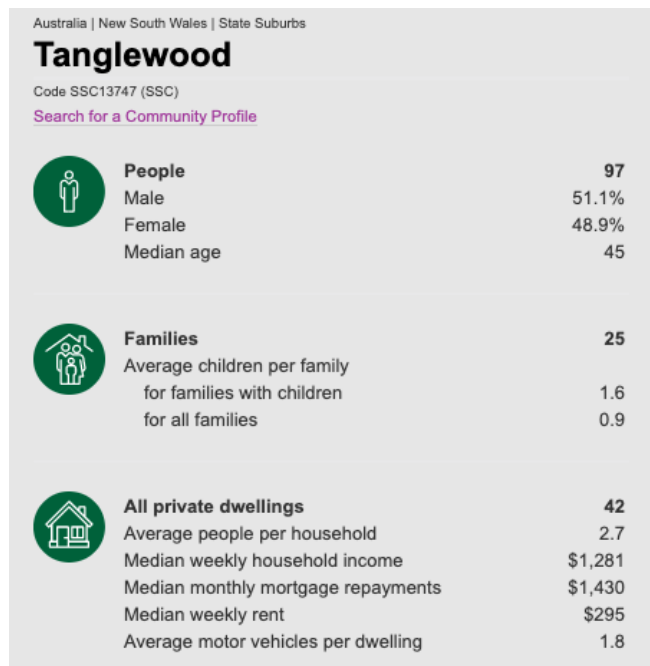
#### 2.1.3.4. Visual Assessments

The Tanglewood Estate, looking east across the property gives the viewer a combination of the flat, low-lying plains, and the dense vegetation leading up the hillside ridge. Looking west across the estate there are the same components, but with the highway and its traffic, as well as a view to the Tweed Range and its mountains in the background. The landscape is agrarian on the floodplain and wooded on the hills and slopes immediate to the site. The development site has cleared hills adjacent to the highway.

## 2.2. BRIEF DEMOGRAPHIC ANALYSIS

Northern New South Wales coastal strip has been experiencing population growth, and it is predicted to remain healthy. The region's population faced 9% growth from 2011 to 2015, and it is expected to grow by 16% over the next few years. The lifestyle, environmental and economic reasons are among the factors drawing people to the area.

Most of the Tweed Shire population includes families with children and a growing retirement community. Demand is expected to dramatically increase for all types of housing and accommodation due to the large public hospital being built in nearby Kingscliff. The hospital is expected to give the surrounding area a major employment increase, boosted with allied services and additional retail outlets.



**Fig. 3:** Tanglewood 2016 census details (Australian Bureau of Statistics 2019)

Tanglewood currently has a small population of 97 people with a median age of 45 years (**Fig. 3**). Currently the most common ancestries found in Tanglewood include Australian, English, Irish and Scottish.

## 2.3. OPPORTUNITIES & CONSTRAINTS OF THE SITE

### 2.3.1. Opportunities

- Growth and development along this major tourist and trade corridor
- Greenfield site – little to no previous development
- Pacific Motorway - Located on the western side of the property
- Residential and mixed-use developments
- Accommodate population growth
- Reserve and protect koalas
- Sustainability, mixed-use development
- Favourable land zoning
- Provision of public services and facilities



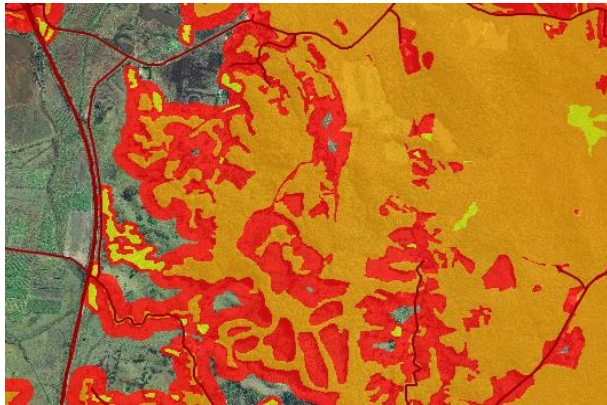
**Fig. 4:** Topography (TSC Planning and Flooding mapping)

### 2.3.2. Constraints

- Topography (Fig. 4)
  - Uneven elevations on the southern and eastern side of the property
- Bushfire (Fig. )
  - Due to the uneven topography in some parts of the site



- Koala habitat (Fig. )
  - Development restrictions by the current land use zoning
- Acid sulfate soils (Fig. 7)
- Flooding hazard (Fig. 8)



**Fig. 5:** Bushfire prone area (TSC Planning and Flooding mapping)



**Fig. 6:** Koala habitat (TSC Planning and Flooding mapping)



**Fig. 7:** Acid Sulfate Soil Planning Maps (TSC Planning and Flooding mapping)



**Fig. 8:** Flooding Inundation Areas Overlay (TSC Planning and Flooding mapping)

## 2.4. STAKEHOLDER ANALYSIS

Stakeholders are individuals or institutions involved in the development, or whose interests may be affected by potential intensive development. There are compatible goals stakeholders want to achieve, as well as conflicts that may arise. It is best to begin stakeholder consultation as soon as possible in the life of a development proposal to ensure clear understanding by those that may be impacted and to realise the overall benefit (Reed & Sims, 2015). Some of the potential stakeholders with an interest in the Tanglewood site and any related potential development are listed below:

1. **Current landholders** – The current landowners may need to adjust their expectation on the price of the land. In this case, based on the weaknesses and threats, the landholder(s) may sell the property at a lower market price. This may need to occur to achieve the real value of the asset and affordability of development.



2. **Developers** – private sector: The developers will identify a scheme that meets the requirements of local government and meets market demand for a sustainable community where a healthy yield in profits can be obtained.
3. **Tweed Shire Council and New South Wales State Planning Agencies** – Government organisations are involved in the development process as arbitrators of ensuring a balance between free market enterprise and the public interest such as ecological enhancement, social equity and economic prosperity.
4. **Financial institutions and investors** - in land development projects. To include brokers for biodiversity offsetting.
5. **Building contractors** - need to be engaged to ensure the buildings are achieving energy, water and waste efficiency requirements and to reduce harmful impacts during and after construction phase.
6. **Real estate agents** – The economic feasibility of development requires real estate professional advice. They are skilled at understanding a potential market in the region.
7. **Professional team** - People who work in specialised areas of need, such as ecologists, designers, engineers, planning consultants, quantity surveyors, project managers, lawyers, accountants, etc.

### 3. SWOT Analysis

Strengths	Weaknesses	Opportunities	Threats
<ul style="list-style-type: none"> <li>• Population and development growth</li> <li>• Lot subdivision</li> <li>• Pacific Motorway</li> <li>• Proximity to the beach</li> <li>• Greenfield site</li> </ul>	<ul style="list-style-type: none"> <li>• Koala habitat overlay</li> <li>• Flooding overlay</li> <li>• Acid sulphate soil</li> <li>• Topography =&gt; bushfire</li> </ul>	<ul style="list-style-type: none"> <li>• Accommodate future growing population</li> <li>• Koala habitat conservation</li> <li>• Mixed-use developments</li> <li>• Public services and facilities</li> <li>• Tourism hub</li> </ul>	<ul style="list-style-type: none"> <li>• Extreme weather conditions =&gt; flooding, bushfire</li> <li>• Koala habitat destruction</li> </ul>

Table 2: SWOT analysis

## 4. Market Research

### 4.1. NATIONAL HOUSING MARKET OVERVIEW

According to CBRE's half-yearly market report, specific recent changes within the political and financial landscapes have had a negative impact on the consumer sentiment regarding house purchases. The Liberal Party winning the federal election in 2019, reduced the likelihood of changes to negative gearing and capital gains tax as suggested by the Labour Party. Combined with the new assistance package for first home buyers cleared much of the uncertainty around the property market until the event of COVID 19 Virus outbreak that has had unprecedented impact on the economy. Furthermore, a continuing relaxation of credit constraints due to successive .25bps cuts to

the official RBA cash rate has created an incentive in market. Forecast are toward a downward price trend and further uncurtaining to the length of an expected economic recession through 2020 onwards. In addition, the increased impacts of climate change and severe weather events is driving demand for housing choices that are resilient and sustainable, where the younger generation of home buyers recognise the economic benefit of ecologically responsive building typologies.<sup>5</sup>

## 4.2. LOCAL OVERVIEW

The Gold Coast and Northern New South Wales property markets currently have a sound long term outlook, with strong infrastructure growth, and subdued housing demand in the short term but with further interest rate cuts as part of the Federal government's economic stimulus package. Rapidly increased population growth and loosening demand on lending criteria, will eventually increase housing demand. Building infrastructure to accommodate the growth includes considerable road works on Tweed Coast road network between Cabarita Beach and Kingscliff and the M1. Recent highway upgrades between Ballina and Coffs Harbour and further south will create far greater demand for land development along this vital commercial corridor. New South Wales State Government has announced large residential land releases around Ballina where job seekers will want to commute further north to reach the South East Queensland commercial opportunities. The highway upgrades have increased the level of access to the northern NSW and into South East Queensland economic hubs. The loosening in credit constraints and a historically low cash rate will eventually see a rise in demand, especially in the northern NSW region and the coastal townships with population migration from the southern states.<sup>6</sup>

Within the Tweed Shire, the population growth has remained significantly higher than national averages with Tweed annual average growth rate of 14% over the previous five years and expected annual growth of 16% over the coming five-year period.<sup>7</sup> As a result of this considerable growth, two new residential development sites have seen approval in the Kings Forest and Cobaki Lakes suburbs to cope with the population influx. The impacts of population growth are predicted to result in a growing demand of retirement-aged people requiring medical and related services. The approval of a new \$500 million-dollar public hospital on the nearby Cudgen Plateau will help facilitate this demand. Gold Coast Airport at Bilinga, 18 kilometres north of Tanglewood is expanding rapidly in response to the increased tourism, economic growth and population. The Gold Coast Airport is currently undergoing a master planned redevelopment including hotels, transport logistics, commercial services and extending the runways for more international flights.

The area of Tanglewood, Casuarina and Cabarita Beach are within the evolving growth corridor between Kingscliff and Byron Bay. This area is attracting three significant types of demographics: young middle-class working families, middle-aged couples looking for a lifestyle change with their children having moved out, and those looking to retire and move out of the major cities. Numerous land-uses of the Tanglewood site will cater to the residents of the surrounding area well into the

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<sup>5</sup> CRC for Low Carbon Living, Growing the Market for Sustainable Homes, Industry Road Map, 2018. ([http://www.lowcarbonlivingcrc.com.au/sites/all/files/publications\\_file\\_attachments/growing\\_market\\_for\\_sustainable\\_homes\\_final.pdf](http://www.lowcarbonlivingcrc.com.au/sites/all/files/publications_file_attachments/growing_market_for_sustainable_homes_final.pdf))

<sup>6</sup> Bock, K. Brunckhorst, D. Coping with Sea Change for Design More Sustainable Regions, Social-Economic Changes Analysis. (2005) University of New England.

<sup>7</sup> Tweed Community Profile 2016. Id. Population Experts.

([https://www.tweed.nsw.gov.au/Documents/Community/Profile/TSC05679\\_id\\_Tweed\\_Briefing\\_Paper.pdf](https://www.tweed.nsw.gov.au/Documents/Community/Profile/TSC05679_id_Tweed_Briefing_Paper.pdf))

future along with other major land releases in the area such as Cobaki Lakes, Kings Forest and Area E as the region continues to grow in popularity.

## **URBAN DESIGN METHODOLOGY AND DEVELOPMENT OPTIONS**

The following mapping gives some indication of the issues involved in creating an economically viable development proposal on this site. Based on the objective of creating a sustainable community and ecology on this site a methodological approach of evaluating barriers that will need to be overcome to further that objective. Through a needs analysis where value is placed on a high yield return on the investment and significant value on biodiversity conservation will require new allocation of the current land use mapping. This approach will provide far more longer-term benefit and be the basis for a balance between biodiversity conservation, protection of critically endangered species such as koalas and yet accommodate the pressures of population growth along the Tweed/Byron M1 Corridor. There are a number of mechanisms that will facilitate the optimum land use outcome and they entail funding and collaboration between all levels of government and non-government agencies that have proven to work well in collaboration, such as Private, Public Partnerships (PPP's). A well resolved master plan can clarify solutions and innovative concepts for sustainable building typologies, place making that enhances the visual amenity, provides a distinct scale and character that reflect local culture. The concept of urban consolidation, (increased densities) and planned economic principles can support job creation. There are many examples evident throughout the region such as the Currumbin Eco Village, Varsity Lakes Master Plan and Genesis on the Gold Coasts. These places have been economically very successful and seen as can highly appealing place to live, work and play, as well as viable examples of how humans and wildlife can coexist.

### **Existing Land Use Zones at Tanglewood**

As indicated in the Tweed Shire land use map below it can be deduced that the current land use zone was created in the 1980's based on an earlier concept master plan drafted by one of the original land holders in 1983. This plan was never approved by Tweed Shire Council although some basic infrastructure was provided with earthworks, clearing of the lower slopes and limited sewer treatment. The current Tweed Shire land use map is an attempt to support a residential community in this location. The issues with the current land use pattern are that it does not maximise the potential of the buildable land, adequately address the hydraulics of the site and works against the protection of koala habitat. For this reason, it is recommended that the council acquire the site and rezone the land, before subdividing for sale on the open market. The core objective being to rezone the land in a manner that is financially profitable and ecologically successful.

Tanglewood  
Master Plan  
1983

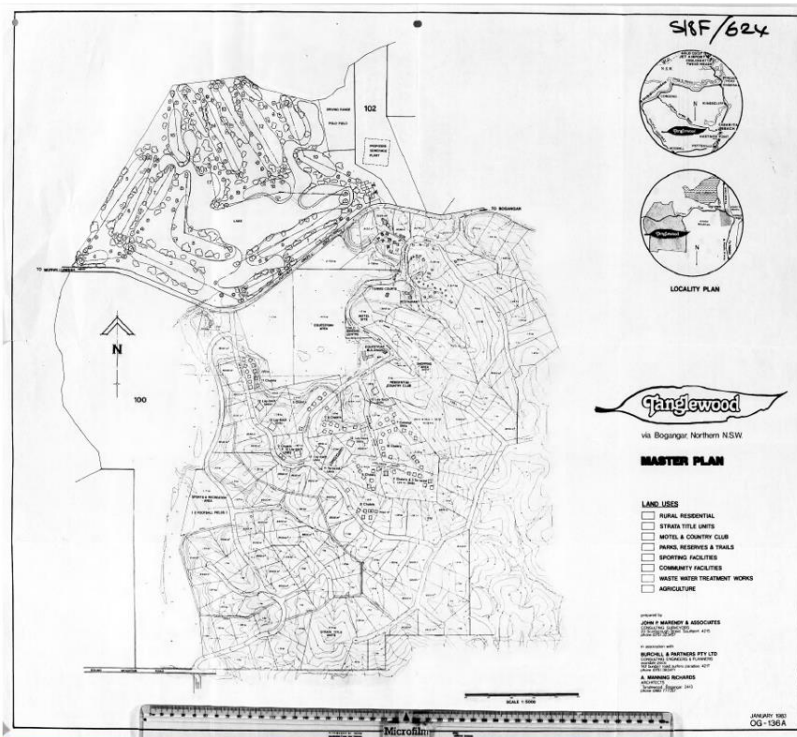
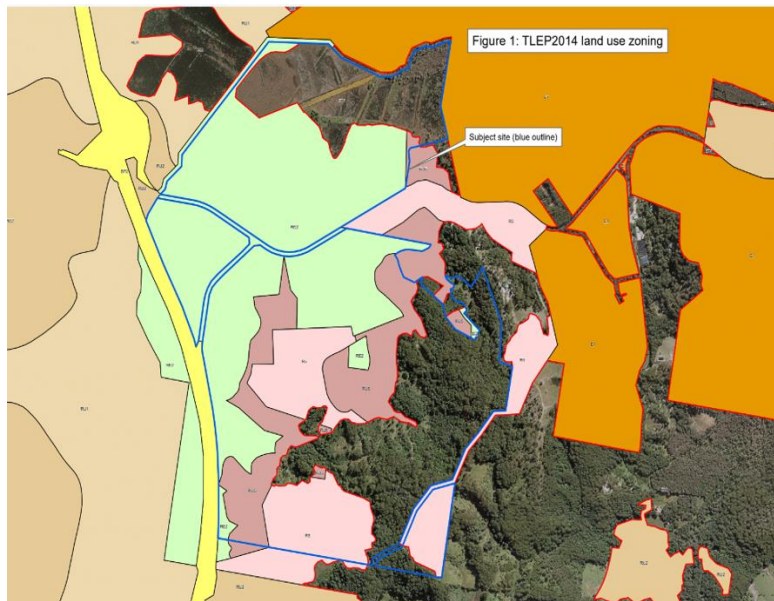


Fig. 9: Tanglewood Master Plan Map 1983

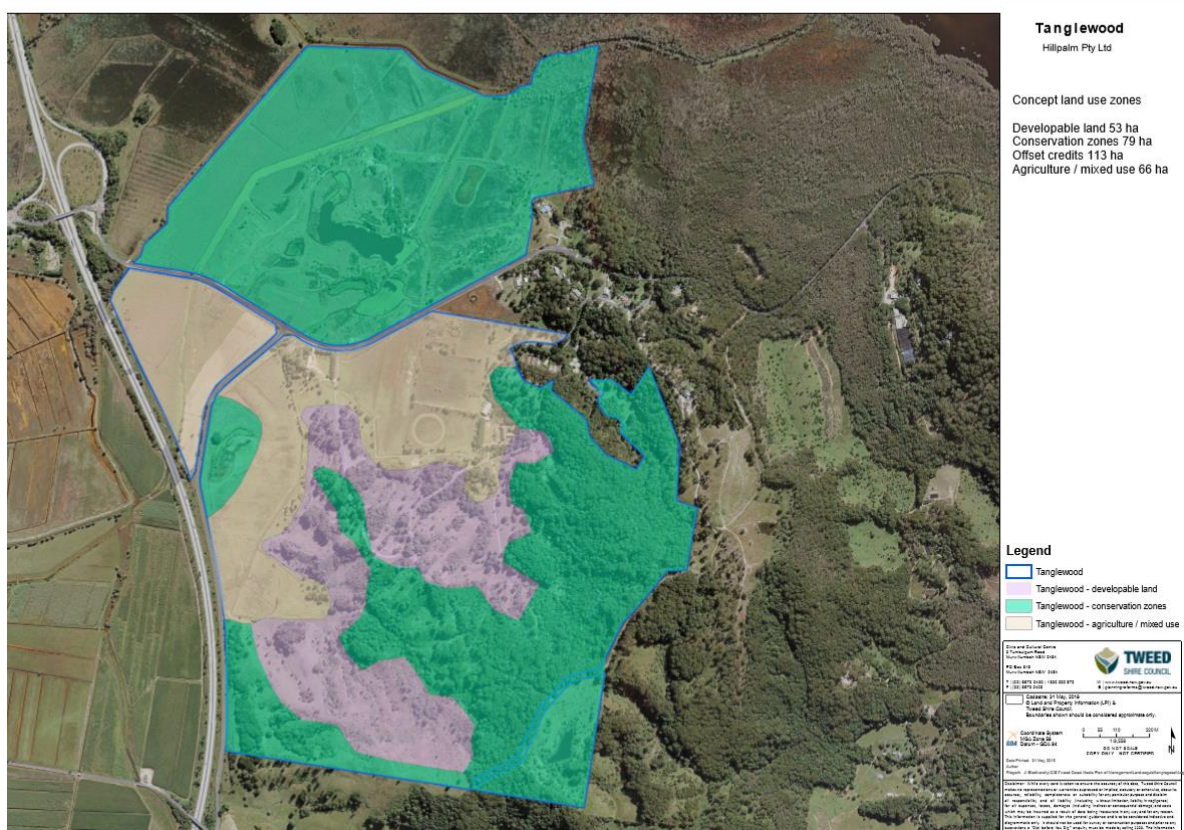
The Tweed Shire LEP map below indicates (figure 10) land use designations of a variety of types. The land use boundaries are not rational in meeting the needs of contemporary lifestyle or supportive of maximising profit and desired environmental objectives. In principle, the land use allocations are reasonable but generally not well aligned. It is recommended here that the land use boundary lines to be redrawn as the current land use zoning does not allow for a built form outcome that will provide a cohesive sustainable community. The image of the Tweed Shire LEP mapping (below) indicates a land use type where residential actives would be in conflict with optimum biodiversity conservation and not provide a walkable mixed-use neighbourhood, which are popular in the current housing market<sup>8</sup>. The existing land uses (TWEED. LEP. 2014), impede ecological protection and the opportunities for vegetation offsetting. By redrafting the land use allocation, it is possible to provide a balance between extracting profit from land sales, while creating new places for commercial enterprise, enhanced in coexistence with preserving of biodiversity and critically engaged species (figure 11).

<sup>8</sup> Sohn, D.W. Moudon, A.V. The Economic Value of Walkable Neighborhood, April 2012 Urban Design International 17(2).





**Fig. 10:** Current Tweed Shire Council Land Use Zone Map for Tanglewood (Tweed LEP 2014 mapping)

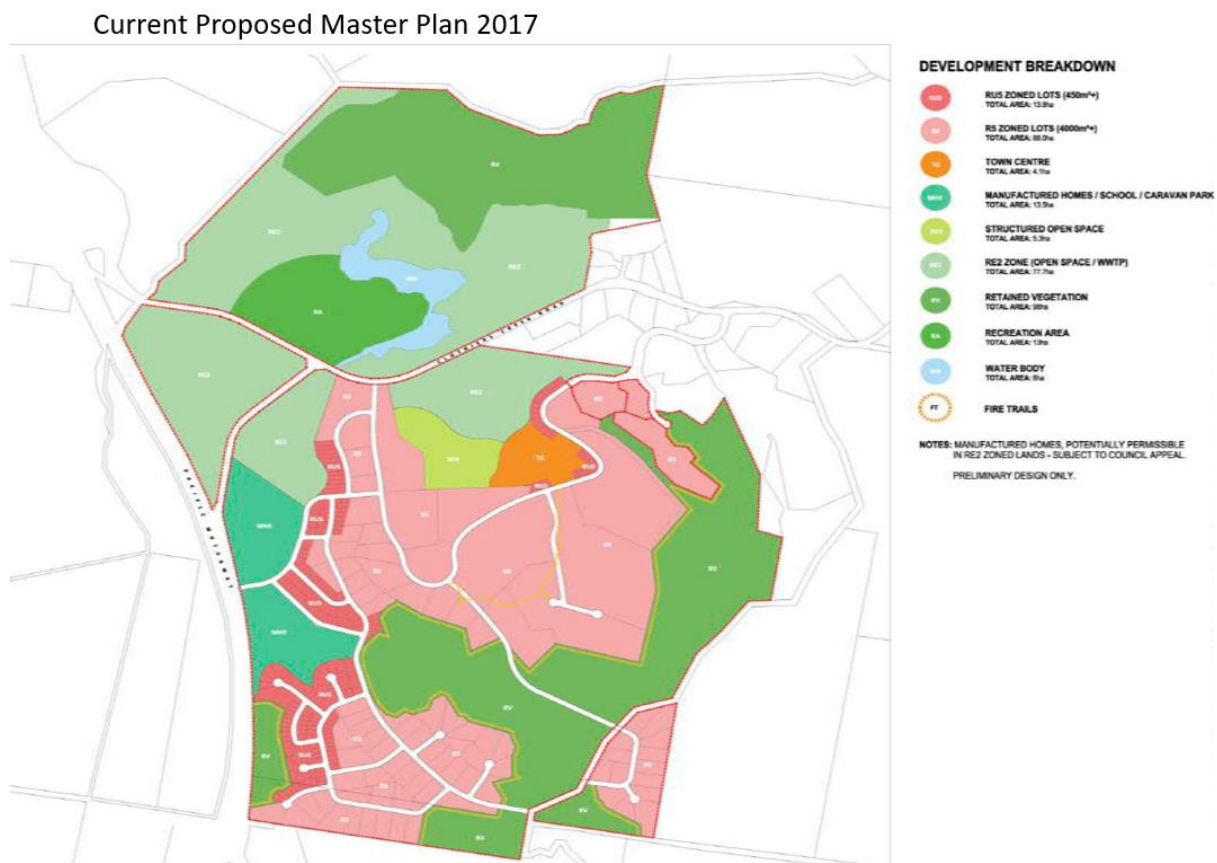


**Fig. 11:** Draft Land Use Map of Balanced Human Settlement. Protected Koala Habitat, Connectivity to Surrounding Biodiversity Corridors and Environmental Offsetting Areas.



### The Current Landholder Plan

The current landholder of the Tanglewood site had a draft master plan prepared in 2017 (figure 12). This map is not based on existing legal land use zoning (Tweed LEP, 2014) and would require the approval by state and local government for a rezoning of the land. In Figure 12) the dark pink areas represent a higher density housing zone, where small lot housing is surrounded by landscape buffers and industrial uses in the flood prone areas. This land use proposal is a potential option as an alternative land use pattern and although may meet a profit on the return of the investment it is not likely to improve the capacity of koalas to be sustained. The hills and gullies on the site are proposed to be large lot housing subdivision that penetrates deep into the existing koala habitat. As witness in Port Macquarie this leads to reduction in koala population and far greater fire risk to residents. The research indicates this kind of urban design arrangement results in lower density housing outcomes that are not compatible to protection of endangered species due to the increased car strikes and dog attacks. Domestic pets commonly found in suburban neighbourhood have proven to be damaging to wildlife and should not be permitted to enter biodiversity conservation areas.<sup>9</sup> The master plan scheme below is from the current marketing material being used to sell the Tanglewood site. This plan is a concept plan only and not approved by Tweed Shire Council. To realise this concept would require substantial planning and other professional guidance to attempt approval. In consideration of the numerous constraints on the site discussed earlier in this report the feasibility of the 2017 scheme is limited.



**Fig. 12:** Current Landholder Land Use Development Plan with Maximum Human Settlement Outcome and Impact on Protected Koala Habitat.

<sup>9</sup> Aust. Dept. of Environment and Heritage 2004. Protecting our Wildlife: Responsible Pet Ownership.  
<https://www.environment.gov.au/resource/protecting-our-wildlife-responsible-pet-ownership>

## 5. The Bond Sustainable Development Concept “Tanglewood Lakes”

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### 5.1. TANGLEWOOD LAKES MASTER PLAN CONCEPT

Bond University has undertaken a high-level draft master planning exercise to aid in providing development options for the Tanglewood site. The urban design layout below in Figure 13 provides a urban design scenario where profitable feasibility is possible and at the same time protect biodiversity. The variety of lot sizes, walkable neighbourhoods’ services with shopping, entertainment and private education would lift land values with mixed-use and medium density development. The urban consolidation model bases on the analysis of opportunities and constraints on the site shows adequate allowance of protected habitat and environmental offsetting.



**Fig. 13:** Bond University Land Use Zone Map Proposal 2020 – “Tanglewood Lakes” – Striving to Achieve a Balance of Human Settlement, Protected Koala Habitat and Environmental Offsetting Sites.

The site is flood prone and, in this concept, would require earth works to raise levels in some locations in order to create safe buildable land. It is suggested that land will be excavated, resulting in the opportunity to have a lake system that would create habitat for estuary species. In this scheme the waterways are integrated with existing water bodies on the north of the site and could be extended to the south in three directions (seen in Fig. 13). In this scheme the total area of the lake is approximately 27 ha. and would require hydraulic engineering. In this plan it is proposed that two islands in the middle of the lake, further protecting equestrian habitat rehabilitation. The image below (Fig.14) shows the wetland habitat regeneration undertaken in Sydney's Olympic Park.



Fig. 14: Sydney Olympic Park Wetland Restoration. (<https://www.sopa.nsw.gov.au/Environment/Sustaining-Healthy-Habitats>)

One of the major constraints of the site is flooding of existing roads. It is proposed here that main roads be elevated above flood height and thus effective in reaching high ground during any potential evacuation event. During flooding months, the current road through the site gets flooded to the point where it is not usable by most vehicles. Implementing these lakes in the design of the Tanglewood site could also be a solution to this issue, ensuring that stormwater runoff is managed to minimise damaging effects. This will imply extra costs in terms of related earthworks and hydraulics but will provide a better planning outcome in the longer term. The earth works and water courses could also greatly improve on visual and landscape amenity, public walking circuit and place making principles like that seen in Robina, where extensive earth work were also undertaken.

## 5.2. RESIDENTIAL

The Bond draft master plan is designed to draw the growing Tweed Coast population to “Tanglewood Lakes” by providing a variety of residential options. This masterplan aims to provide a housing types that cater to the current target market of empty nesters, single households and small young families. The theme and character of this new community would embrace a landscape aesthetic of water-based habitat, parklands infused by mixed-use and different densities of housing



with easy access to neighbourhood centres. It is anticipated that all new dwellings will be constructed utilising sustainable development principles, while creating a strong sense of place. The master plan's residential land uses are divided into three different lot sizes - large, medium and high density.



Fig. 15: The Ecovillage at Ithaca, New York. ( Source: <https://community-that-works.org/portfolio/ecovillage/> )

#### 5.2.1. Large Lot Housing

In the Tanglewood Lake's proposal, large lot housing is in the north-east part of the site. The design allows for 80 large lots with approximately 870m<sup>2</sup> land area each. Most of these lots have a water view of the lake. Due to the large size of the lots, it is encouraged for high-end dwelling design and the potential of co-housing buildings. The urban design layout of this part of the site is an enclave setting to evoke a sense of privacy. Also, this neighbourhood is in walking distance to the town centre, where passive transport modalities and community engagement can be enhanced. An example of this building typology can be found at The Ecovillage at Ithaca, in up-state New York (figure 15).

#### 5.2.2. Medium Density Housing

Medium density development is proposed in the north-west area of Tanglewood Lakes closer to the M1 freeway where a landscape buffer will help mitigate the sound of traffic. This area, seen in red in Figure 13, comprises of 216 lots approximately 450m<sup>2</sup> each. Some of the lots will include views to the lake. These lots are intended to be more affordable and aimed at young working-class families. The remaining lots are designed in a grid like pattern to maximise connectivity and legibility in navigating the site. Figures 16 below, demonstrate the potential attached housing designs which cater mainly towards families with children due to the proximity to a private school and other amenities. The example used here is "Habitat" in Byron Bay, a newly created sustainable, mixed use community. Habitat, when originally proposed was seen as too radical an increase in density but has proven to been extremely successful and prosperous location for business and to live.



Fig. 16: Illustration of Habitat, and sustainable residential, mixed use community in Byron Bay (source: <https://www.domain.com.au/20-29-9-easy-street-byron-bay-nsw-2481-2015998683>)



### 5.2.3. Mixed -Use Density for the Village Centre

The master plan of Tanglewood Lakes has two large blocks for higher density residential uses. These two blocks are located close to the medium density residential and commercial town centre. This urban consolidated form includes a network of walking and cycling trails to support alternative transport uses to traditional car movements. North of the lake lies the largest high-density block 8,400m<sup>2</sup> total area, while the second block is located south of the lake 6,500m<sup>2</sup> total area. Larger blocks are suitable to a shopping centre under one ownership or subdivision into a smaller town centre configuration of mixed uses. This land use pattern is proposed to be similar to other town centres.



Fig. 17: Paramatta Ways Walking Strategy, City of Paramatta 2017. (Source: <https://www.cityofparramatta.nsw.gov.au/sites/council/files/2017-06/Parramatta%20Ways%20Walking%20Strategy.pdf>)

### 5.3. MOTORWAY SERVICE/CHARGE CENTRE AND LIGHT INDUSTRIAL PARK

In the not too distant future, there will be greater demand for electric vehicle charging stations where automotive passengers will have time to kill while waiting for their vehicle to charge. As seen in figure 18, this provides a market for food, entertainment and experiences. The draft master plan provides for these opportunities<sup>10</sup>.

Situated in the smallest parcel of land (closest to the M1) within the draft masterplan it is recommended that a “Motorway Service Centre” be established with light industrial facilities around it catering to local demand of small to medium sized enterprises. With the ease of exiting the freeway off ramp there is an excellent opportunity to have a transit stop for shipping and other related local distribution centre and small businesses such as surf board manufacturing. Currently it is drawn as eighteen blocks varying in size from 1,500 to 3,500m<sup>2</sup>.

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<sup>10</sup> Katwala, A. Will Autonomous and Electric Vehicles Kill the Petrol Station. Institute of Mechanical Engineering, July 2017. <https://www.imeche.org/news/news-article/will-autonomous-and-electric-vehicles-kill-the-petrol-station>



Fig. 18: Motorway Service and Charging Station. (Source: <https://www.imeche.org/news/news-article/will-autonomous-and-electric-vehicles-kill-the-petrol-station>)

#### 5.4. COMMERCIAL

In the centre of the Bond concept plan is the two-storey town centre. This will contain numerous shops, restaurants, fast food outlets, entertainment, medical facilities, and car parking. The town centre is designed to be walkable and multi modal forms of transport are included in the circulation network. Car parking is situated on the outer edges of the CBD hub as this land may be developed further as we move toward autonomous vehicles and where less private car ownership is anticipated. A visual example is shown in figure 17 and 18.

This village centre will be comprised of retail, restaurants and entertainment experiences. The village centre will be based in a garden like setting, fully pedestrianised and landscaped in subtropical landscape theme and a child safe water feature.



Fig. 18: Award winning Ed.Square Town Centre in Western Sydney. (Source: <https://www.shoppingcentrenews.com.au/shopping-centre-news/industry-news/frasers-property-reveals-new-tenants-for-ed-square-town-centre/>)





Fig. 19: Ed.Square Town Centre in Western Sydney. (Source: <https://www.shoppingcentrenews.com.au/shopping-centre-news/industry-news/frasers-property-reveals-new-tenants-for-ed-square-town-centre/>)

The concept master plan includes functional approaches in providing delivery vehicles access to the site at the south-west corner of the town centre. Loading zones will be easily accessed for back of house shipping and delivery's as well as for waste management. Depot and delivery services will also be adjacent to supermarkets to ensure efficient and regular restocking of large stores. The total area designated as commercial is approximately 27,000m<sup>2</sup>.

## 5.5. INTEGRATED EDUCATION

Research shows that education in the close future will change substantially. With online teaching and learning technologies there is anticipated to be great demand for collaborative spaces where the line between traditional education modality will merge with technology where there will be a need to gather and collaborate in flexible spaces where other amenities are available. A good example of this current trend into the future can be found in the new sustainable campus development by Microsoft in the Silicon Valley in Northern California (Figure 20).

The Bond concept draft master plan has made allowance for an education and training centre that will be privately held and allow for high school and adult learning activities to be carried out. The centre is also anticipated to be a community centre, where spaces can be rented out for short term activities such as social events and short-term courses. Although there is a TAFE College in Kingscliff, there is no purpose built, private training facilities locally. In this scheme the educational and training facilities are near open spaces and play fields and other recreational activities. This plan has been programmed with flexibility considering changes in the market and land use allocations may accommodate disruptive technologies and other unexpected events into the future. The multi learning education facility is easily accessible to residential neighbourhoods of Tanglewood Lakes, such as designated bus lanes and bus interchange in the village centre. After school care would be well suited to this location as well.



Fig. 20: Microsoft Sustainable Campus in the Silicon Valley. (Source: <https://blogs.microsoft.com/blog/2017/12/05/building-sustainable-campus-silicon-valley/>)

## 5.6. INFRASTRUCTURE AND ROAD NETWORK

The infrastructure requires for any future development at Tanglewood Lakes is going require considerable investment. The cost of infrastructure can be paid for in a number of ways but generally the cost is brought through into the sale of property and ongoing contribution from user groups. Basic infrastructure such as sewer, water, electricity can be rolled out both as main trunk line provision by a single supplier but also accommodated on site as shown in Figure 30 below. Renewable energy, onsite sewer treatment and on-site water harvesting should be encouraged in some measure for every new building. There are a number of examples of how these technologies and methods can be applied in the final section of this Prospectus.

The road network has been considered thoroughly during the urban design process. There is anticipated to comprise of 27,735 m<sup>2</sup> of internal roads implemented in the service station and light industrial area, with a road width average of 15 metres. Most of the residential areas are planned for a road width of area 11 metres wide, comprising of an approximate area of 87,263 m<sup>2</sup>. There will be two dominant pavements in the Plaza area to give respect to the pedestrians and cyclists. It will support a more sustainable mode of transport by walking and cycling.

## 5.7. FUTURE PROOFING THE DEVELOPMENT POTENTIAL

This draft master plan includes three main areas with the potential for future development:

1. Commercial area to the south of the town centre; 12,300 sqm
2. Medium residential area to the northeast of the plan; and,
3. Medium residential area/extension to the schools to the north of the education precinct.

These areas will be developed as the population grows in Tanglewood Lakes, and as people are attracted to the region.

## 6. Key Indicators for Success of Tanglewood Lakes

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### 6.1. HIGHEST AND BEST USE OF THE SITE

The summary document provided three potential developments, each with very different purposes of the site based on the research carried out:

1. Mixed-use, including residential, commercial uses.
2. Environmental Offset areas.
3. Koala rehabilitation and potential species care centre.

The highest and best use of the site in this proposal includes both a residential and commercial area and a large portion of land for environmental offset. This will ensure the plan is economically feasible. The intended result is a large part of the land adjoining protect koala habitat will and enhance survival rates of this iconic species.

### 6.2. CURRENT AND FUTURE MARKET TRENDS OF DEVELOPMENT TYPE(S)

Considering the objective of maximising profit and ecological protection it is also essential to consider the conservation and protection of endangered and threatened species at this location. This area of New South Wales is known to be vital koala habitat. Koala's are classified as vulnerable, some sources state that it may be already "functionally extinct." The 2019 bushfires on the east coast of Australia has led to extensive loss in native species population, with estimates that thousands of koalas have been killed to date<sup>11</sup>. For this reason, it is essential that known koala habitat is protected as best as possible with the offset being suggested as the best way to do this while creating finance reward and ecological protection.

### 6.3. INCORPORATING AGED CARE, RETAIL AND COMMERCIAL 'SHOP TOP' MIXED-USE

The master plan contains several different purposes, including residential, commercial, light industrial, and education land uses. The housing layout is designed to accommodate the increasing population. In recognition of the increased population in this area, commercial, educational and small enterprise spaces are aimed at providing jobs and affordable housing opportunities. For example, the service station and light industrial area will provide jobs, taking advantage of passing traffic on the motorway as well as servicing the local community.

### 6.4. ESTIMATIONS ON RETURN ON INVESTMENT

Financial success in the land development industry is dependent on the concept of return on investment (ROI). During the process of compiling information and design options for this masterplan there has been in part a focus in reaching the standard ROI of a 20%. The concepts put forward here involved significant research and analysis of the different potential development options. In the following pages and Appendix, real estate comparatives and market trends have been thoroughly analysed. As a result, this masterplan includes nearly 300 residentially zoned lots, six retail lots, 18 industrial lots and the incorporation of offset land for the conservation of koala habitat and the environment.

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<sup>11</sup> Speight, N. Understanding the True Impact of Bushfires on Our Koala Population, University of Adelaide, Research Innovation, 2020. (Source: <https://www.adelaide.edu.au/research/news/list/2020/01/15/understanding-the-true-impact-of-bushfires-on-our-koala-population>).



Due to the subject land needing significant work for viability of development, we have proposed that the council excavate the lake and use the spoils as landfill to raise the ground out of the flood zone. Furthermore, the Council will implement the roads within the development, the subdivision and subsequently the rezoning of the property.

Following a research and evaluation of typical lots for all the proposed land uses, the project value came in at just under \$100 million, with an expected ROI of over 21%.

## 7. Strategic Approach to Acquisition and Sale of the Site

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### 7.1. PURCHASE AND LAND SUBDIVISION FUNDING MODELS

To achieve an outcome where critical habitat could be protected while creating a high return in profits, it will be necessary to acquire the entire site. This acquisition could happen in a number of ways with contributions from Federal, State and Local governments funds, in collaboration with a development company and through the raising of the funds through a non-profit organisation set up as a corporation, similar to the Southbank Corporation in Brisbane. It is recommended here that once a commitment for furthering the options of acquisition and subdivision of the site, that further studies be undertaken, such as a business case, further detailed master planning and land valuation such as environmental offset pricing, further explore different development options and consideration for staging of development.

In the accompanying white paper accompanying this report, there has been considerable research into case studies of where collaboration between different levels of government and in some cases private enterprise are brought together to fund the development cost in order to achieve good development outcomes. For example, an option for the Tanglewood site to adopted a master plan similar to one put forward here may be where the Tweed Shire Council seek funding from the state and federal government to acquire the site for the purpose of koala conservation and management. Thereby, the TSC could manage the land and be given the opportunity to rezone the land uses and sell off excess land with more certainty of development outcomes. For example; if the land is purchased by government agencies, large portions of the site could be classified as Crown Land that has either operational or community designation. The restriction on these lands are categorised as follows;

Community land; includes parks, reserves or sports grounds. Land classified as community land cannot be sold by the local council. The koala conservation and environmental offset areas could potentially be classified as community land.

Operational land is not generally open to the public but may be used for public purposes such as works depots or garages. It may also be held as a temporary asset by the Council, as defined under the Local Government Act 1993. Operational land can be sold or developed for private use<sup>12</sup>. This is a viable option for the proposed development areas within the masterplan. This could also be an option for the offset zoned areas, but these lots would still have to be kept under ownership of the Tweed Shire Council as Crown Land Managers, potentially with a Biodiversity Stewardship Agreement (BSA) or similar imitative in place.<sup>13</sup>

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<sup>12</sup> Alc.org.au. (2011). *Local Councils and Public Land*. Retrieved from: <http://alc.org.au/media/63828/Planning%20Fact%20Sheet%205%20-%20Local%20councils%20and%20public%20land.pdf> [03/03/2020].

<sup>13</sup> New South Wales Crown Land Act 2016 No58. ([http://www.austlii.edu.au/au/legis/nsw/num\\_act/clma2016n58226.pdf](http://www.austlii.edu.au/au/legis/nsw/num_act/clma2016n58226.pdf))

BSAs are agreements with the NSW state government Biodiversity Conservation Trust (BCT) and provide landowners with an economic incentive to protect biodiversity. Through selling credits, the BSA owner receives annual grants from the BCT to further manage the offset areas or can even make profit off the sale<sup>14</sup>.

There is also an opportunity for the Tweed Shire Council to sell the subdivided land with Public-Private Partnership (PPP's) agreements with a potential buyer. This would ensure that any development to happen on the site would provide a public asset or service<sup>15</sup>. The Council also has the option of selling offset areas. In the case of any such action, the Council must ensure that the buyer has favorable intentions in terms of biodiversity concerns. Measures to be taken to ensure legal protection of biodiversity include entering a BSA that would be legally tied to the tenure of the land independent of the landowner. Entering a Public Private Partnership with a potential landowner needs to be explored more closely. Not just development company but also investment agencies such as supersaturation funds.

For rezoning the land, the first step is refining the master plan in order to scrutinise an orderly land development pattern and how staging the sale of the property could best be achieved in light of other project objectives. Once this is undertaken and agreed upon, the creation of subdivided lots into different parcels would be the next logical step. It is important to keep in mind that there are three major land tenure types that will impact on the subdivision process; 1. deposited, 2. Strata Title, and Community Plans – All three have different ownership opportunities and constraints. Please review the table below:

#### Plan types of NSW (NSW LRS 2019)

Types of plan	Definition	Examples
Deposited plans	A plan lodged with NSW LRS showing land boundary information. It is most commonly depicting the subdivision of a parcel of land.	To create a new land parcel; Subdivided or deal with an existing parcel of land
Strata plans	Depicts the subdivision of a parcel of land to allow multiple occupancies and separate ownership of individual units	Various units within an apartment building; Several townhouses within a development; Retirement villages; Rural development concepts
Community plans	Divide land into a community property lot and two or more community development lots	A Shared park; Separate areas for residential, commercial, recreational and industrial uses

<sup>14</sup> Bct.nsw.gov.au. (2018). *Biodiversity Offsets Program*. Retrieved from: <https://www.bct.nsw.gov.au/biodiversity-offsets-program> [03/03/2020].

<sup>15</sup> Treasury.nsw.gov.au. (2018). *Public Private Partnerships (PPPs)*. Retrieved from: <https://www.treasury.nsw.gov.au/finance-resource/public-private-partnerships-ppps> [03/03/2020].

	per the <i>Community Land Development Act 1989</i>	
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**Table 4:** *Plan types of NSW (NSW LRS 2019)*

In either, selling the land as Operational Land or selling it in the Torrens Title system, would be approved as either strata or community title plans. For the residential purposes of the masterplan, either strata or community plans could be used. For most of the residential uses, community plans would be the recommended subdivision approach.

## 8. Tanglewood Lakes Feasibility Analysis

The following feasibility analysis has been conducted under the assumption that the project will be 100% equity funded. The land acquisition price of eleven and a half million dollars has been adopted due to a real estate comparative analysis, a wide range of restriction currently facing the site, such as flood prone land and fire threat. In 2017 the property was listed at thirty million dollars and was unable to sell; it currently sits at twenty-six million dollars with limited to no real interest due to the amount of required work and other issues mentioned earlier in this report. The concept draft master plan recommends rezoning the land, undertaking earth works and create sub-division allowing for the sale of parcels in a staged manner to private development companies. The draft master plan described above is only one example of development scenarios. Increased land values can be realised by breaking down the value of each lot using a rezoned master plan. The land values in this report were found using comparable parcels of land from either similar developments or similar property types within the region, using their site value of land sale price as comparative examples.

The associated development costs have been evaluated into four different sections: Land, Building Costs, Professional Fees and Contingency Rate. In addition, and Environmental Offset feasibility is included below. This process is standard practice in the development feasibility analysis and has helped justify the land purchase price point. Further analysis is recommended before making a purchase offer.

### 8.1. BUILDING COSTS

Although it is not recommended that buildings be part of this proposal it is important to consider the cost associated with earth works, grading and other infrastructure cost as it impacts on the estimation of land value. Therefore, the associated development cost has been estimated and broken down into two separate elements. The first of which is the cost of excavating the land required for the increasing land size outside of flood prone levels, resulting in the creation of lakes and storm retention basins. The lake is an essential element to managing flood risk, the appropriate hydraulic engineering of the site and allowing higher yields in residential development options. The excavation cost estimate of \$12.7 per cubic metre was extracted from the Australian Institute of Quantity Surveyors (AIQS) Building Cost Index. The total surface area of the lake was estimated at approximately 350,000m<sup>2</sup> (35 HA), with a depth of five metres, which gives a cubic meterage of 1,750,000. The lake excavation is the most significant cost involved with our proposed development due to the sheer amount of excavation required for the project's viability.

The other assessed building cost is that of roadworks and other associated infrastructure cost. Similarly, the cost per square metre of 100mm thick bitumen bound base spread of \$25 was extracted from the Rawlinson's Construction Costs, 2019. Implementing necessary infrastructure,

such as roads, assists in developing different precincts and rezoning the developable area. The road widths were split between 14 metres wide for the service station and the industrial regions for ease of truck access, whereas, all other areas consist of 11-metre-wide roads for car, bike and footpath access. The total square meterage of the useable road area is approximately 115,000, which equated to a total approximate roadworks cost of \$2,875,000. Further elevation of road networks maybe required to address flood risk and evacuation protocols.

## **8.2. PROFESSIONAL FEES**

The professional fees section covers the areas of agency sales fee percentage, legal fees, surveying fees, subdivision costs and the costs of preliminary consulting fees. These calculations will need to be reviewed and considered in more detail as the project moves forward and therefore are only indicative numbers.

The sales agency fee for this development is estimated to be 1.5%. This percentage has been put forward following consultation with industry experts for the sale of vacant subdivided blocks. The projected amount based on this master plan proposal is approximately \$1.85 million dollars.

The legal fee calculation is utilising a rate of \$660 dollars (inclusive of GST) multiplied by the number of lots for the development proposal. This figure was gathered through consultation with industry experts and produced a total value of \$216,480.

Similarly, the surveying fee was calculated using a suggested industry flat rate of \$750 per lot. The final figure for the development surveying is \$246,000.

The subdivision costs for the development has been calculated on a rate per lot of \$1,000. This figure is drawn from the industry standard. Therefore, the subdivision cost per lot has an average cost of \$1,000, and a total subdivision cost of approximately \$328,000.

The final assessed professional fee amount is the preliminary consulting fees, a lump sum of approximately \$400,000 has been attributed to this area to cover the initial assessments of civil, geo-tech, vegetation management, planning advice and state interests check which will take a minimum of three years to reach the end of these processes. These fee cost may vary depending on how much work maybe done inhouse by local government staff.

## **8.3. CONTINGENCY RATE**

When entering any development, there must be a percentage of the development costs that is available when unforeseen costs arise. The recommended industry standard is between three and five percent. For this project, we have adopted a rate of five percent.

## **8.4. OFFSET VALUE**

The land that has been assessed as environmental offset land under the New South Wales Biodiversity Scheme has a combined value of \$3,427,536. The offset scheme and the methodology used to reach this value are explained in the following pages.

## 8.5. FEASIBILITY ANALYSIS

Tanglewood Feasibility							
Project Value							
Individual Lots		No. Lots	Total Lot Area (SQM)	Value/SQM		Value/Lot	Total Value
	865sqm Lot Housing	80	69,200	\$	346.8	\$ 300,000	\$ 24,000,000
	450sqm Lot Housing	216	97,200	\$	500.0	\$ 225,000	\$ 48,600,000
	High Density Blocks	2	14,900	\$	201.3	\$ 1,500,000	\$ 3,000,000
	Industrial	18	36,650	\$	147.3	\$ 300,000	\$ 5,400,000
	Retail	6	48,012	\$	262.4	\$ 2,100,000	\$ 12,600,000
	Vacant Land Total	1	98,698	\$	2.6	\$ 257,961	\$ 257,961
	School (Without Ovals)	1	25,550	\$	73.4	\$ 1,875,000	\$ 1,875,000
	Offset Land	1					\$ 3,427,526
	Total Lots (Exc. Offset)	328					
Total Project Value							\$ 99,160,487
Development Costs							
Land	Size (SQM)	Cost/SQM	Years				Total
	Purchase Price	3,300,000	3.484848485				\$ 11,500,000
	Land Holding Costs	\$ 372,104	2.5				\$ 930,260
Building Costs	Cost/SQM	Total Area/Units					Total
	Lake & Land Fill	\$ 12	1,750,000				\$ 21,000,000
	Road Works	\$ 25	114,998				\$ 2,874,950
	Sewage and Water	\$ 125,000	328				\$ 41,000,000
Professional Fees	Cost	Units					Total
	Agency Fees %	1.50%	1				\$ 172,500
	Legal	\$ 216,480	328				\$ 216,480
	Surveying Fees	\$ 246,000	328				\$ 246,000
	Subdivision Costs	\$ 1,000	328				\$ 328,000
	Preliminary Consulting Fees	\$ 200,000	1				\$ 200,000
Development Costs							\$ 66,037,930
Contingency	Rate						
	Rate %	5.00%					\$ 3,301,897
Performance Indicators							
Total Development Value							\$ 99,160,487
Total Development Cost							\$ 81,770,087
Project Profit							\$ 17,390,400
Return on Investment							21.27%

Fig. 21: Feasibility Analysis of proposed development on Tanglewood site

## 8.6. PERFORMANCE INDICATORS

### 8.6.1. Total Development Value

The total development value of the project is a combination of all the different values of the separate vacant lots based upon their proposed zoning and land size. The justification of values will be explained further in the 'As If Complete' valuation. The final development value is \$99,160,487

### 8.6.2. Total Development Cost

The total development costs are an accumulation of all previously referenced costs associated with the project. The final total for the development costs is \$66,037,930.

### 8.6.3. Project Profit

Following the analysis of project value and costs, the projected profit is \$17,390,400.



#### 8.6.4. ROI

Having assessed all cost and subtracting them from the project value, the return on investment for the Tanglewood Lakes proposal is 21.27%.

## 9. Offset Land Valuation Breakdown

The New South Wales Biodiversity Offset Scheme is designed to help create flora and fauna conservation areas throughout the state. The way the system works is that vegetation and animals are given a credit value and depending on several factors, the number of credits per hectare can then be determined across the desired area. Credits are also split into either ecosystem credits (flora) and species credits (fauna).

For the Tanglewood site as a basic assessment. A formalise assessment is needed by an accredited offset consultant to clarify financial values. There are three main types of credits which can be assessed to produce a monetary value for the land; these are the Scribbly Gum, Coastal Floodplain Sedgeland and koala habitat. An approximation of the value of the credits can be found using the credit price index and the credit calculator on the New South Wales government website.

Through consultation with the Biodiversity Conservation Trust of New South Wales, it was established that common credit price per hectare is between 2-7 credits depending on the quality and other factors. Therefore, for a valuation breakdown, we have adopted a rate of five credits per hectare for all three credit types within the property.

The following estimations will need to be verified by a qualified ecologist. It is expected that within the Tanglewood Lakes development there are approximately 85 hectares of scribbly gum tree forest within the main parcel of the property. Using the figure from the offset calculator, the scribbly gum carries a charge per credit of \$2,366.90 and multiple by five provides a per hectare value of \$13,017.97 (Fig. 46). The total value of the scribbly gum on the property equates to \$1,105,000.

IBRA sub region	PCT common name	Threaten status	Offset trading group	Risk premium	Administrative cost	Methodology adjustment factor	Charge per credit	No. of ecosystem credits	Final credits charge
Scenic Rim	1136 - Scribbly Gum - Red Bloodwood heathy open forest of the coastal lowlands of the NSW North Coast Bioregion	No	North Coast Dry Sclerophyll Forests; <50%	19.72%	\$76.52	2.2615	\$2,366.90	5	\$11,834.52
Subtotal (excl. GST)									\$11,834.52
GST									\$1,183.45
Total ecosystem credits (incl. GST)									\$13,017.97
Calculated as on: 26/11/2019 21:09:08									Grand total
									\$13,017.97

Fig. 22: Per Hectare Price of Scribbly Gum Credits

Furthermore, the top land parcel is primarily made up of low-lying coastal floodplain sedgeland. With the proposed development supporting a primary body of lake water, this leaves an area of approximately 79 hectares of sedgeland. Coastal sedgeland carry a credit value of \$5,0006.46 per credit at their current value, which provides a per hectare price of \$27,353.52 inclusive of GST (Figure 23). The total area of the sedgeland ecosystem credits on the site equates to \$2,175,306.

Within the area of biodiversity offset credits, species credits are considered a bonus value as they sit on top of an ecosystem credit. Due to this, the subject property has the same amount of area and credits that the scribbly gum carries, but at a different cost. At their current value, Koala credits carry

a credit value of \$245.86, which provides a per hectare value of \$1,732.54 inclusive of GST (Fig. 24). This gives the subject species credits a total value of \$147,220.

Species profile ID	Species	Threat Status	Price per credit	Risk premium	Administrative cost	No. of species credits	Final credits price
10616	<i>Phascolarctos cinereus</i> (Koala)	Vulnerable	\$245.86	19.9900%	\$20.00	5	\$1,575.04
Subtotal (excl. GST)							\$1,575.04
GST							\$157.50
Total species credits (incl. GST)							\$1,732.54
Calculated as on: 26/11/2019 20:47:34							Grand total
							\$1,732.54

**Fig. 24:** Per Hectare Price of Koala Credits

Following the individual valuation of the applicable credits, the total assessed value of the potential offset land is \$3,427,526.

### Disclaimers

\*\*\* To find the real value of any potential offset land, the owner must pay for a BAM accredited person to come to investigate and value the possible credits on the property.

\*\*\* Due to no access to the subject site, the areas for each credit type are calculated using the NSW Biodiversity Offset Scheme website.

## 10. Development Timeframes

The development timeframe for the project is primarily based around the planning and approval stage, with the excavation of the lake, landfilling and implementation of road infrastructure being the only building elements before on selling the property to a developer. As a result, eighteen months to two years has been allocated to the planning and approval stage, with twelve to eighteen months being assigned to the excavation, landfilling and roadwork implementation. It is anticipated land sale and contribution fees from development applications would fund other forms of infrastructure such as water supply, sewer etc.

## 11. Market Demand and Justification

Earlier in this report it was indicated that Tanglewood has minimal demographic data; therefore statistical area of Tweed Shire has been applied. Looking at Tweed Shire's population, in 2016, there were 91,371 people living in 42,793 dwellings in the area (idcommunity, n.d.). Tweed Shire's population is expected to increase more than double in the next couple of decades years. Based on the age structure and household types, Tweed Shire has a higher percentage of couples with or without children, including empty nesters. The area is also facing a growing population of retirees, pre-retirees, older workers and seniors.

Age Structure	--	--	--
Babies and pre-schoolers (0 to 4)	4,779	5.2	5.8
Primary schoolers (5 to 11)	7,515	8.2	8.9
Secondary schoolers (12 to 17)	6,248	6.8	7.3
Tertiary education/independence (18 to 24)	5,699	6.2	7.9
Young workforce (25 to 34)	8,219	9.0	11.0
Parents and homebuilders (35 to 49)	16,042	17.6	18.0
Older workers & pre-retirees (50 to 59)	13,092	14.3	13.8
Empty nesters and retirees (60 to 69)	13,275	14.5	13.1
Seniors (70 to 84)	12,927	14.1	11.4
Frail aged (85 and over)	3,581	3.9	2.7
Household Types	--	--	--
Couples with children	8,652	22.5	25.4
Couples without children	10,407	27.0	27.0
One parent families	4,278	11.1	11.0
Lone person households	10,108	26.3	25.5
Group households	1,332	3.5	3.1

**Fig. 25:** *Age structure and household types*

The vision for Tanglewood Lakes is targeted towards accommodating the growing population by providing a sustainable mixed-used village with residential precincts of different affordability levels and a light industry service centre. On the other hand, the site has many environmental restrictions such as flooding, koala habitat, acid sulphate soils and bushfire hazards. These overlays affected the planning and designing of this master plan which caused the change to recreational uses instead of residential uses. In addition, the vision is to offset most of the site and propose recreational and koala conservation and promotion that may be an opportunity as a tourist attraction strategically located between the Gold Coast and Byron Bay. Limited infrastructure including water, electricity and sewage are major constraints on the site and considerable investment is need over time to meet the demands of a growing community.

## 12. Appendix

The appendix includes data that supports the findings in this report. Firstly an 'As if Complete' valuation included below, will assist in justifying the figures used within the feasibility analysis.



An 'As If Complete' valuation on the proposed development for 1200 Clothiers Creek Road, Tanglewood. The below valuation has used land purchase prices from RP Data

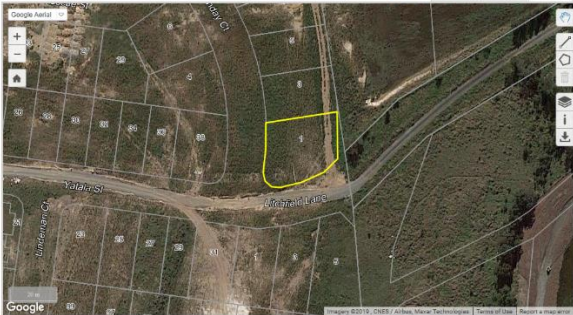

([https://www.rp-data.com/riz=1C1CHBF\\_en-GBAU892AU892&oq=RpData&aqs=chrome.1.69i57j0l7.11031j0j8&sourceid=chrome&ie=UTF-8](https://www.rp-data.com/riz=1C1CHBF_en-GBAU892AU892&oq=RpData&aqs=chrome.1.69i57j0l7.11031j0j8&sourceid=chrome&ie=UTF-8))

and site values from similar developments to use as a direct comparison for the subject site to gain the most accurate valuation figures. This valuation is for an 'As If Complete' valuation, not for mortgage security purposes.

Due to the wide-ranging nature of zoning types and the potential future uses of the subject site, the following valuation will be broken down into the different zone types for a fair valuation of each land and density type.

## 12.1. LOW-DENSITY HOUSING

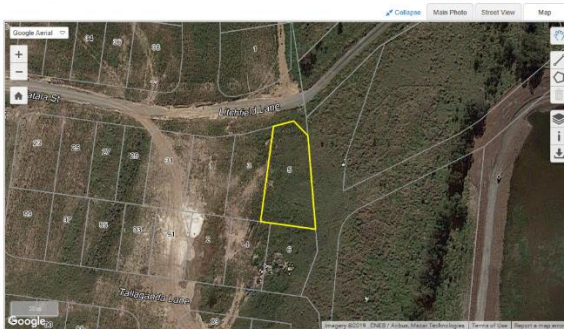
"GAINSBOROUGH GREENS"	
<p>4 Fortescue Street Pimpama, QLD, 4209</p> 	
<b>Address:</b> 4 Fortescue Street, Pimpama	<b>Sale Price:</b> \$290,000
<b>Site Area:</b> 774m <sup>2</sup>	<b>Comparison:</b> Inferior
<p><b>Comments:</b> 4 Fortescue Street is 90m<sup>2</sup> smaller than the proposed size of our low-density housing blocks. However, the block is located within the Gainsborough Greens Development, which is very similar to our proposed development.</p>	

"GAINSBOROUGH GREENS"	
<p>1 Whitsunday Circuit Pimpama, QLD, 4209</p> 	
<b>Address:</b> 1 Whitsunday Circuit, Pimpama	<b>Sale Price:</b> \$330,000
<b>Site Area:</b> 835m <sup>2</sup>	<b>Comparison:</b> Similar
<p><b>Comments:</b> 1 Whitsunday Circuit is also located within the Gainsborough Greens Development in Pimpama. It possesses a similar land size to the proposed blocks of the proposed development. Furthermore, Pimpama is located 30 minutes from the Gold Coast, like Tanglewood, which makes the values of these properties very comparable due to their locality.</p>	



### "GAINSBOROUGH GREENS"

5 Litchfield Lane Pimpama, QLD, 4209



**Address:** 5 Litchfield Lane, Pimpama

**Sale Price:** \$333,000

**Site Area:** 852m<sup>2</sup>

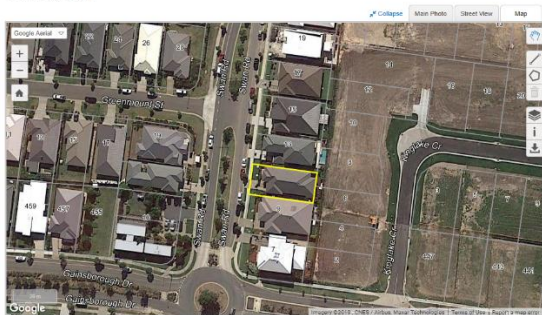
**Comparison:** Similar

**Comments:** 5 Litchfield Lane is the most similar block of land within the Pimpama development that resembles the proposed low residential blocks within the Tanglewood development. With the points of locality and similarity in development, this property represents the most similar comparison to the proposed low-density blocks in the Tanglewood development. What must be pointed out is these properties sold between 2016 and 2017, which means these sale prices would be higher if sold today.

## 12.2.MEDIUM DENSITY HOUSING

### "GAINSBOROUGH GREENS"

11 Swan Road Pimpama, QLD, 4209



**Address:** 11 Swan Road, Pimpama

**Land Value:** \$230,000

**Site Area:** 419m<sup>2</sup>

**Comparison:** Inferior

**Comments:** 11 Swan Road is an example of one of the smaller medium density blocks within the Pimpama development. This is represented through the current land value of the property being \$230,000, which is the entry-level land value within the development. Furthermore, the property is smaller than the proposed medium density blocks making it slightly inferior.

### "GAINSBOROUGH GREENS"

65 Whitsunday Circuit Pimpama, QLD, 4209



**Address:** 65 Whitsunday Circuit, Pimpama

**Sale Price:** \$255,000

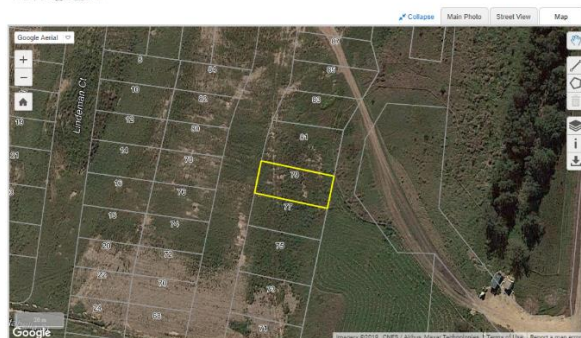
**Site Area:** 459m<sup>2</sup>

**Comparison:** Similar

**Comments:** 65 Whitsunday Circuit is very similar to the proposed medium density blocks within the proposed Tanglewood development. The sale price of \$255,000 is from 2017, which represents fair market value for the year it was sold.

### "GAINSBOROUGH GREENS"

79 Lindeman Circuit Pimpama, QLD, 4209



**Address:** 79 Lindeman Circuit, Pimpama

**Sale Price:** \$259,000

**Site Area:** 448m<sup>2</sup>

**Comparison:** Similar

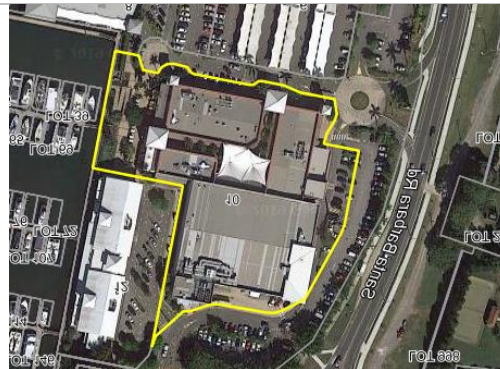
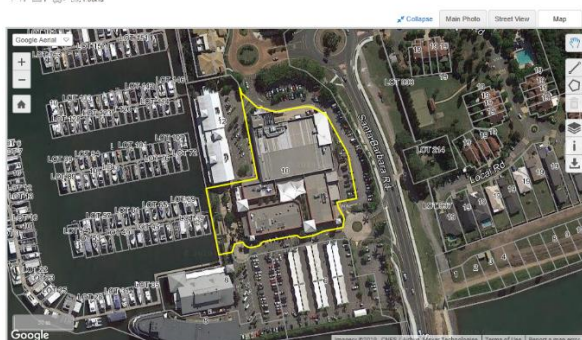
**Comments:** Similarly, 79 Lindeman Circuit is a great comparable for the proposed medium density blocks, and the sale price represents a fair market price for vacant land within the 2017 market.



## 12.3.RETAIL

### “HOPE ISLAND SHOPPING CENTRE”

10 Santa Barbara Road Hope Island, QLD, 4212



**Address:** 10 Santa Barbara Road, Hope Island

**Site Value:** \$3,900,000

**Site Area:** 10,600m<sup>2</sup>

**Comparison:** Similar

**Comments:** 10 Santa Barbara Road represents a slightly sized retail block to the largest proposed block on the proposed development. However, it is located within a growing community with a marina to its western side. The site value of \$3,900,00 is similar, if not slightly superior to the proposed development due to significant surrounding infrastructure.

### “CASUARINA LOCAL CENTRE”

482 Casuarina Way Casuarina, NSW, 2487



**Address:** 482 Casuarina Way, Casuarina

**Sale Price:** \$27,400,000

**Site Area:** 16,300m<sup>2</sup>

**Comparison:** Similar

**Comments:** 482 Casuarina Way is almost identical in size to the largest proposed retail site. Although no site value was provided, the site's locality and size are very similar to what the Tanglewood development is looking to achieve in the future.

## “THE COMMONS”

480 Casuarina Way Casuarina, NSW, 2487



**Address:** 480 Casuarina Way, Casuarina

**Sale Price:** \$3,450,150

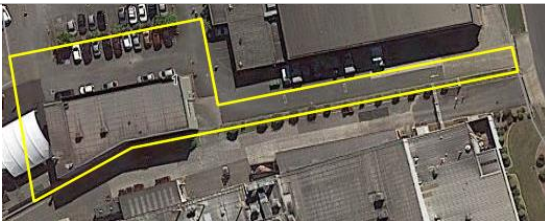
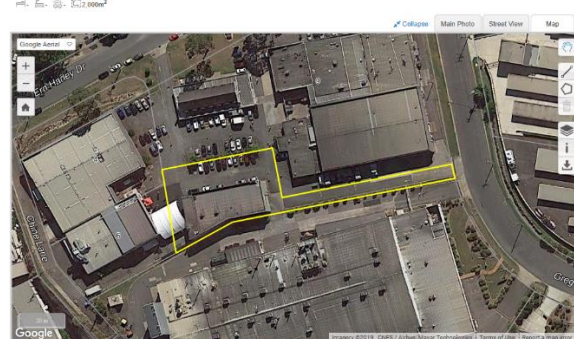
**Site Area:** 6,273m<sup>2</sup>

**Comparison:** Similar

**Comments:** The Commons is located just across the road from the Casuarina Local Centre and represents a similar lot size to the four smaller proposed retail blocks. Due to its proximity and size, the Commons parcel of land is the most comparable site and value for the proposed retail blocks.

## 12.4. INDUSTRIAL

1 Greg Chappell Drive Burleigh Heads, QLD, 4220



**Address:** 1 Greg Chappell Drive, Burleigh Heads

**Value:** \$450,000

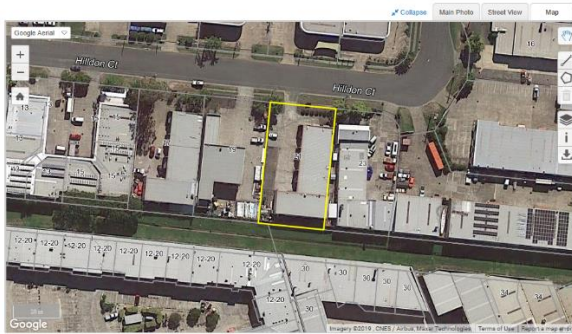
**Site Area:** 2,000m<sup>2</sup>

**Comparison:** Similar

**Comments:** Greg Chappell Drive is located within the Burleigh Heads Industrial area and with similar proximity to the M1 motorway that the Tanglewood site does. Furthermore, the site represents a middle ground in terms of block sizing for the proposed development, and with a value of \$450,000 provides a similar comparison.



21 Hildon Court Nerang, QLD, 4211



**Address:** 21 Hildon Court, Nerang

**Value:** \$550,000

**Site Area:** 1,500m<sup>2</sup>

**Comparison:** Superior

**Comments:** 21 Hildon Court has a size like the smaller proposed industrial blocks, although it carries a land value of \$550,000 due to its proximity to the Gold Coast, and location within a prominent industrial area.



19 Jay Gee Court Nerang, QLD, 4211



**Address:** 19 Jay Gee Court, Nerang

**Value:** \$550,000

**Site Area:** 1,911m<sup>2</sup>



**Comparison:** Similar

**Comments:** 19 Jay Gee Court is a similar comparison to that within the proposed development due to the block size of 1,900m<sup>2</sup> and its slightly irregular shape. However, the land value of \$550,000 represents the already thriving industrial area of Nerang.





## 12.5.HIGH-DENSITY ZONED LAND PARCELS



<p>1-7 Moores Crescent Varsity Lakes, QLD, 4227</p> 	
<p><b>Address:</b> 1 Moores Crescent, Varsity Lakes</p>	<p><b>Land Value:</b> \$1,500,000</p>
<p><b>Site Area:</b> 5,334m<sup>2</sup></p>	<p><b>Comparison:</b> Similar</p>
<p><b>Comments:</b> 1 Moores Crescent is a high-density block within Varsity Lakes very similar to those proposed alongside the medium density housing in the Tanglewood development. The property overlooks a lake like the proposed high-density blocks.</p>	

<p>35 Robina Town Centre Drive Robina, QLD, 4226</p> 	
<p><b>Address:</b> 35 Robina Town Centre Drive, Robina</p>	<p><b>Sale Price (Sept 2000):</b> \$1,272,000</p>
<p><b>Site Area:</b> 6,760m<sup>2</sup></p>	<p><b>Comparison:</b> Similar</p>
<p><b>Comments:</b> 35 Robina Town Centre Drive is the most similar comparable in terms of the locality as it is located next to Robina Town Centre, much like the proposed blocks.</p>	



	
<b>Address:</b> 50 Riverwalk Avenue, Robina	<b>Value:</b> \$2,800,000
<b>Site Area:</b> 5,210m <sup>2</sup>	<b>Comparison:</b> Superior
<b>Comments:</b> 50 Riverwalk Avenue is located amongst medium density housing and close to a retail centre. The site area is slightly smaller than the proposed blocks, but it is located within Robina close to many existing amenities which do not exist on the Tanglewood site currently.	

## 12.6.SCHOOL COMPARISON

"ALL SAINTS SCHOOL SITE VALUE"	
	
<b>Address:</b> 102-104 Highfield Drive, Merrimac	<b>Value:</b> \$3,100,000
<b>Site Area:</b> 20,860m <sup>2</sup>	<b>Comparison:</b> Superior
<b>Comments:</b> All Saints Anglican College represents a very similar property in size and shape as the proposed school within Tanglewood. It is in Merrimac close to the highway and has a small community surrounding it in comparison to many other major schools. This makes it a nice comparable; however, the existing infrastructure makes it a more superior block of land.	

## 12.7.'AS IF COMPLETE VALUATION FINAL ASSESSMENT

The following table provides value ranges for all comparable housing types to the proposed development.

Lot Type	Minimum Range	Maximum Range	Total Area Range	Price/Sqm Range
Low Density	\$290,000	\$333,000	770 - 855	\$375 - \$390
Medium Density	\$230,000	\$259,000	419 - 460	\$550 - 570
High Density	\$1,272,000	\$2,800,000	5,200 - 6,750	\$240 - \$415
Retail	\$3,450,000	\$3,900,000	6,250 – 16,300	\$240 - \$550
Industrial	\$450,000	\$550,000	1,500 – 2,000	\$275 - \$300
School	\$3,100,000	\$3,100,000	20,860	\$148.5

**Table 6:** *Value ranges for all comparable housing types to proposed development*

#### *Disclaimers*

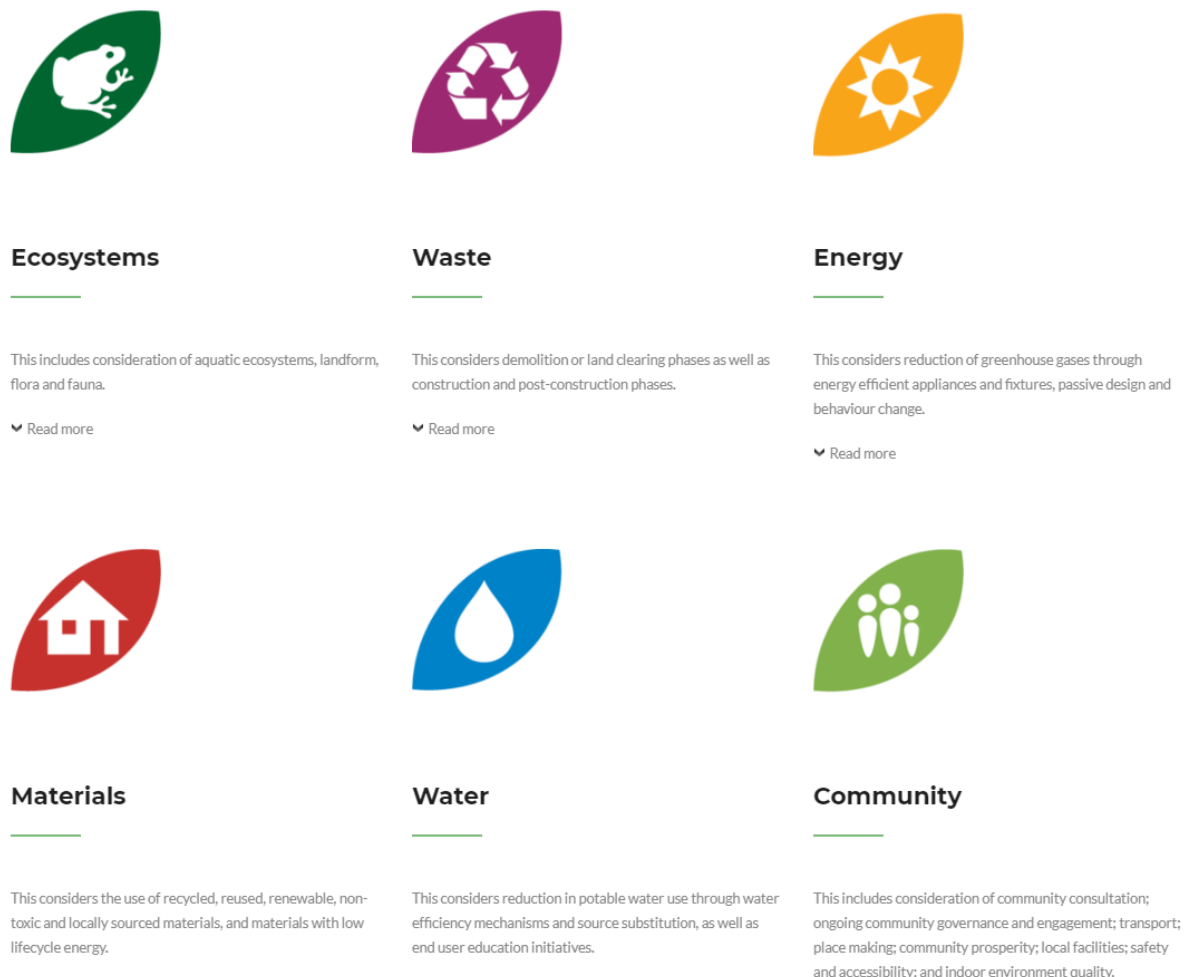
\*\*\* This valuation is based on the retail price of the land. However, the feasibility analysis has applied a 25% discount rate to all lots to on-sell the development to a developer/s.



## 13. Sustainability Principles for Tanglewood Lake

### 13.1. ACHIEVING SUSTAINABLE DEVELOPMENT UTILISING RATING TOOLS

Figure 26 depicts the EnviroDevelopment criteria and will be the basis for the sustainability features of this masterplan development.



**Fig. 26:** Elements used to manage development in the area to attain a high sustainability rating (EnviroDevelopment 2019)

#### 13.1.1. Ecosystem

The objective of the ecosystem leaf is to maintain healthy and resilient ecosystems based on natural diversity. This development proposal meets these standards for the following reasons:

- Most of the high environmental significance is left as an offset on this site. The offset needs to be of locally native vegetation, and any existing local plants must be protected during construction.
- As the development for this masterplan is restricted to a minimal area of the site, the protection of existing vegetation is easily achievable.
- Avoiding water pollution should be quite easily achievable as the design of this masterplan revolves around the central river and lake areas, so having polluted water would negatively

impact on the value of housing and beauty of the natural area. Any stormwater runoff should be cleaned through a local irrigation system before running into the lakes.

- Minimisation of disruption: natural landforms will be slightly changed; however, the main high-value ecosystem areas will not be impacted by this development.
- Protection of existing habitats can be achieved by installing a fence along the back boundary of the developments to protect the existing koala habitat.
- The enhancement of viable habitat size is achieved by a large amount of area dedicated to offset, to likely reduce fragmentation of habitats.
- Promotion of biodiversity and sustainability can be done in the town centre area of development, with either a plaque or building/floor dedicated to explaining and helping spread information about the offset areas of Tanglewood.

#### 13.1.2. Waste

The objective of the Waste leaf is to reduce landfill and have more efficient use of materials. This can be achieved in the following ways:

- The existing properties on the site which need to be demolished can have any usable materials reused somewhere else in the development. The development will need to have a significant focus on natural theming, where recycled materials can be used in place of new ones.
- Minimisation of site pollution is up to the developer of the site but should be stated in the masterplan that pollution on site should be kept to a minimum.

#### 13.1.3. Energy

The focus of the energy tree is to reduce the usage of non-renewable power and promote renewable energy. This can be achieved in the following ways:

- Reducing energy usage through design will mainly be done through smart building design, such as north-facing windows and insulation.
- The use of alternative energy sources can be built into the requirements on developers, requiring a solar system to be installed with the construction of the building.

#### 13.1.4. Materials

The focus of the materials section considers the use of recycled, renewable, non-toxic and locally sourced materials with low lifecycle energy. This can be achieved by the following:

- The selection of materials from environmentally responsible sources can be implemented in the masterplan, such as:
  - o Reused materials
  - o Recyclable resources
  - o Renewable sources
  - o Non-polluting sources
  - o Materials that are low emissions
- Encouraging high indoor air quality can be achieved using materials and keeping the environment with lots of plants to improve overall air quality
- Maintaining affordability will be through the remote nature of the site; the pricing will be cheap until the demand for the final sections increases.

### 13.1.5. Water

The focus of the water leaf is to improve water efficiency. This can be achieved by the following:

- Water flow limiters on most housing developments to reduce the water usage from each person.
- Alternative water sources incorporated in the designs of both residential and commercial areas. This includes a 'site-wide' water tank for the different districts of commercial and 'per dwelling' water tanks involved in the mandatory design principles.
- Implementation of rain-water tanks and related water-cleaning systems to ensure adequate water quality.
- Recycled water within dwellings should be implemented as part of the design of buildings. Each dwelling should have a water filtration system that allows for reuse of water within that building.
- There is also potential to use potential groundwater from the site as a water-resource to any developments on the site. This would make the site more self-sufficient, meaning more sustainable. This is especially favourable during periods of drought, when local water supply reservoirs tend to be less resourceful.

### 13.1.6. Community

The community leaf is designed to encourage social community interaction and the reduction of private vehicles. It also strives for security in the social community. This can be achieved by:

- To promote community cohesiveness, a masterplan lot type and subdivisions of larger plots will help as the design type over the area will be relatively similar. Additionally, material requirements will assist with tying this together.
- Encouraging the use of pedestrian traffic and public transport can be done by having footpaths on both sides of the road and having some pedestrian-only shortcuts through areas which will potentially be faster.
- Reduction of needing to leave the local area by introducing employment, education and services is achieved by having predetermined areas for education, jobs and services in the masterplan.



Fig. 27: Off grid sustainable home. (Source: <https://commons.wikimedia.org/wiki/File:Sustainable.jpg>)

## 13.2.IMPROVEMENT STRATEGIES

Sustainability can be defined as the ability to maintain healthy environmental, social and economic systems in balance, indefinitely, on a global and local scale. Climate change is becoming an increasingly pressing concern which creates the need to accommodate sustainable buildings that offer minimal environmental impact and maximum human comfort. In Australia, sustainable considerations such as energy efficiency and water management are regulated under national and state building codes. This allows today's architects, developers and planners to conserve resources and materials and construct dwellings that work with their natural surroundings rather than against them. It is essential to provide sustainable developments in Tanglewood that has minimal impact on the environment while simultaneously meeting current and future needs. The following elements are sustainable design and construction elements which are recommended to adopt in the final development (Tanglewood Lakes).

### 13.2.1. Environmental

#### 13.2.1.1. *Energy*

Around 40% of the world's energy resources are used in our buildings – both residential and commercial. Passive design principles including thermal mass, external shading, building orientation, cross ventilation and better insulation in buildings lead to less reliance on energy-hungry mechanical systems to maintain comfortable internal temperatures. Using renewable energy further reduces a building's environmental impact. All new dwellings in Australia must now comply with the energy-efficiency requirements of the Building Code of Australia (BCA). (City of Whittlesea, n.d.)

A good building design decreases power consumption; reduces the effects of climate change and saves money. Fig. 38 demonstrates typical energy consumption in residential dwellings. Design elements that can be applied in Tanglewood to improve energy efficiency in buildings include design elements such as double-glazed windows for insulation, roof vents that allow hot air to escape, window shading, a light-coloured roof to reflect heat, internal layout and orientation.

Adopting Environmentally Sustainable Design (ESD) principles in the design and construction of buildings and renovations can result in marked benefits, both now and in the future. Owners/Occupiers can expect:

- Lower energy bills due to less reliance on active heating and cooling systems
- Improved living comfort
- Futureproofing of the building asset

While developers and builders can take advantage of:

- Enhanced market appeal to prospective purchasers
- Higher investment returns
- A development that meets best practice standards and more importantly, community expectations.

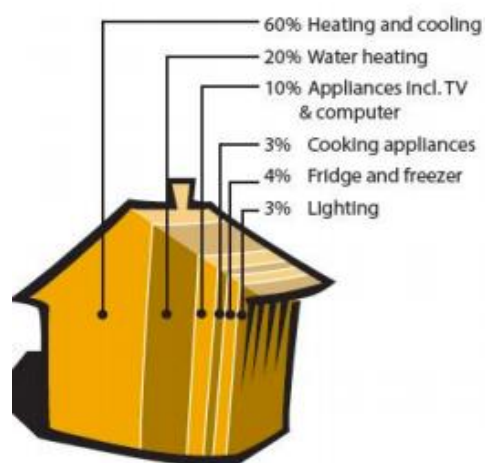


Fig. 38: Energy consumption in homes



In addition to good “green” design and performance, many buildings are now being designed to generate their energy to supplement or meet every day’s energy consumption. The Tweed Shire Council supports these initiatives and recommends exploring onsite renewable energy production. Renewable energy options include photovoltaic solar panels and small wind turbines for electricity production, solar hot-water heating systems, and geothermal systems for space heating and cooling.



Fig. 39: Solar panels example

#### 13.2.1.2. Orientation

The orientation of a building affects its sustainability. Good orientation can increase the building’s energy efficiency making it more desirable and liveable. Also, it results in lower energy bills and reduced greenhouse gas emissions. Good orientation, combined with other energy efficiency features, can reduce or even eliminate the need for auxiliary heating and cooling, resulting in lower energy bills, reduced greenhouse gas emissions and improved comfort. It takes account of summer and winter variations in the sun’s path as well as the direction and type of winds, such as cooling breezes.

In Australia, North orientation is the desired orientation to minimise sun exposure and capture cooling breezes in summer and receive more solar radiation in winter. It is beneficial to ensure longer walls of a building face north to minimise sun exposure to the sun in summer and maximise it in winter (Fig. 40 and Fig. 41).

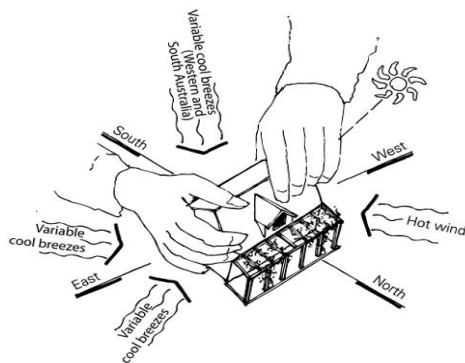


Fig. 28: Building orientation

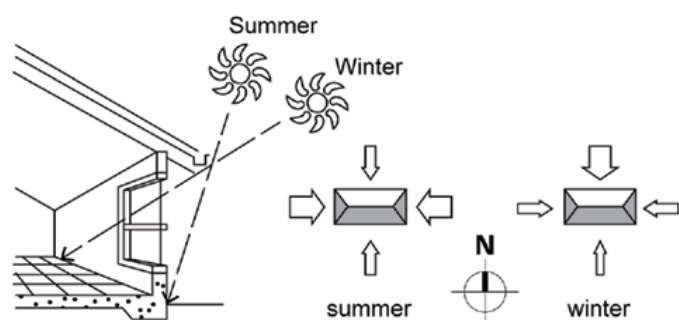


Fig. 29: Average daily solar radiation on vertical surfaces

Solar north deviates significantly from magnetic north throughout Australia. Therefore, buildings should be facing solar north, not magnetic north. The ideal orientation in Australia can be up to 20° west of north and 30° east of north which can still allow reasonable passive sun control. In warmer climates such as in Australia, orientations east of north can allow better capture of cooling breezes

#### 13.2.1.3. Water

On average, hot water uses around 30% of NSW household's energy. It is essential to choose a highly efficient system that reduces energy costs and building's environmental footprint to ensure sustainability. Examples of sustainable water heating methods include gas-fuelled systems and solar hot water systems. Gas fuelled systems are commonly more efficient than electricity-powered systems. A solar hot water system provides a large proportion of the energy required to heat water by directly using the sun's energy. Where possible, supplement outstanding energy requirements using a gas booster, known as a gas-boosted solar hot water system.

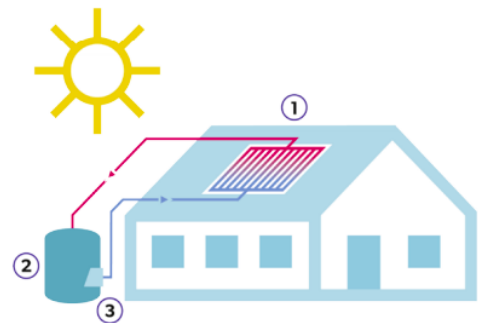


Fig.30: Solar hot water system

#### 13.2.1.4. Landscaping & site impact

Working with the natural surroundings of buildings rather than against them is vital to ensure the site's environmental sustainability. Effective landscaping is one way to improve sustainability- for example, considering the natural features of the site; including topography, the local climate, native flora and fauna, and cultural features. Therefore, the design should consider retaining existing vegetation.

#### 13.2.2. Social

Socially sustainable buildings are designed to meet the needs of current and future population needs. They should offer a variety of features such as comfort, access, safety and security with a secure environment that is well suited to its surroundings.

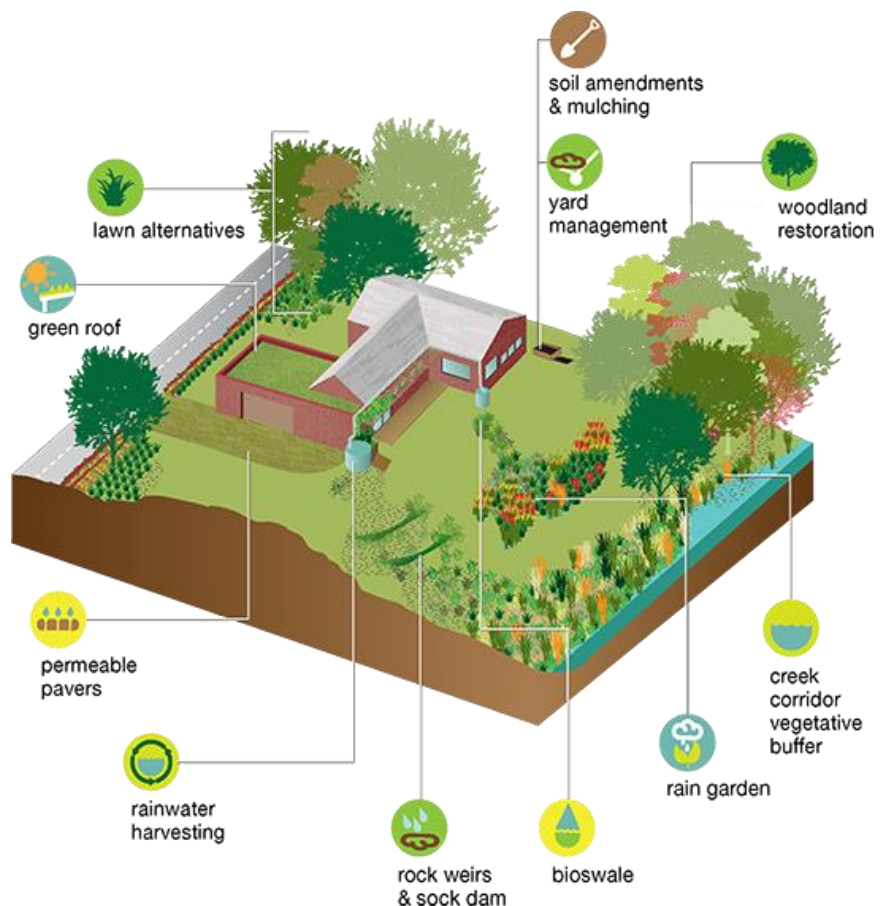


Fig. 31: Sustainable landscaping

#### 13.2.2.1. Health & comfort

This feature should be achieved through providing buildings that are thermally, visually and acoustically comfortable. Also, ensuring the absence of hazards to human health (e.g. the presence of toxic chemicals, mould, etc.). Proper natural lighting and ventilation maximise comfort and health.

#### **13.2.2.2.        *Transportation methods***

The site should provide a variety of transportation methods, including pedestrian and cycling paths. This can maximise the security of the site.

#### **13.2.3. Economic**

Housing affordability is a growing issue in most Australian cities. Well-designed, climate-appropriate sustainable improvements make a home more affordable over its life span. Most energy and water-saving improvements increase affordability over the life span of the home. Moreover, house sizes affect initial purchase cost, materials consumption and ongoing heating, cooling and maintenance costs.

## **14. Life-Cycle Analysis and Payback Periods**

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### **14.1.LIFE-CYCLE ANALYSIS**

The goal of this project has been to provide Tweed Shire Council with recommendations for the future development of Tanglewood.

At an early stage, it was determined that Tweed Shire Council has a particular focus on developments which support the local environment, and in particular the significant koala habitat. It is for this reason that offset was found to be a suitable recommendation, by allowing that land to be kept intact while providing some financial incentive.

Alongside offset, a master plan has been developed which would assist Tweed Shire Council in determining a potential future use for the site which would be profitable. This master plan will help the Council with rezoning, subdivision and staging of Tanglewood Lakes to be sold to developers in future.

### **14.2.PAYBACK PERIODS**

It is intended that Tweed Shire Council purchase the land to be rezoned and sold to a developer(s). The payback will be at the point of sale of the rezoned property. This will pass on all costs of development, including the development application and construction, to the buyer. Allowing the Council to avoid incurring these costs themselves and passing any risk on to the buyer.

The potential return on the master plan can be calculated (in the feasibility below) to determine how much the land parcels can be sold for, thereby ensuring Council are able to attain a 20% ROI.

Payback could occur as soon as 24-30 months from site purchase.

## 15. Applicable Planning Legislation

Instruments	Value Triggered
<i>Environmental Planning and Assessment Act 1979</i>	N/A
<i>Environmental Planning and Assessment Regulation 2000</i>	SEPPs & LEPs
State Environmental Planning Policies (SEPPs)	<i>North Coast Regional Plan 2036</i>
Local Environmental Plans (LEPs)	Land zoning Height of building Minimum lot size Floor space ratio Acid sulphate soils Heritage items
Development Control Plans	Flooding Bushfire
Policies and Guidelines	N/A

**Table 1:** Values prescribed by State Planning Instruments

### 15.1.STATE LEGISLATION

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) is the prevailing state planning legislation which is supported by the *Environmental Planning and Assessment Act Regulation 2000*.

The relevant State Environmental Planning Policy (SEPP), in this case, is the *North Coast Regional Plan 2036*, which has four main goals:

- The most stunning environment in NSW;
- A thriving, interconnected economy;
- Vibrant and engaged communities; and
- Great housing choice and lifestyle options.

Both of SEPPs and Local Environmental Plans (LEPs) are environmental planning instruments, which are statutory plans made under Part 3 of the EP&A Act and direct the land use and planning of NSW developments.



## 15.2. LOCAL INSTRUMENTS

LEPs are the primary local planning tools of NSW. They guide planning decisions for local government areas by providing the framework for potential development of land. The following LEPs are relevant to the Tanglewood Estate.

### 15.2.1. Land Zoning (LZN 2014)

The proposed site contains four major land zoning types:

- R5 – Large Lot Residential
- RU5 – Village
- RE2 – Private Recreation
- DM Deferred Matter, E zone Environmental Conservation

### 15.2.2. Height of Buildings (HOB 2014.Fig. 32.)

The limit of building heights is:

- J – 9 metres
- N2 – 13.6 metres
- K – 10 metres



Fig. 32: Building Height Provisions (HOB 2014)

### 15.2.3. Minimum Lot Size (LSZ 2014) (Error! Reference source not found.)

There are three minimum lot sizes of this site:

- Y – 1ha
- G – 450 m<sup>2</sup>
- Area A – not less than 0.4 ha (Clause 4.2A(2) of Tweed Local Environmental Plan)

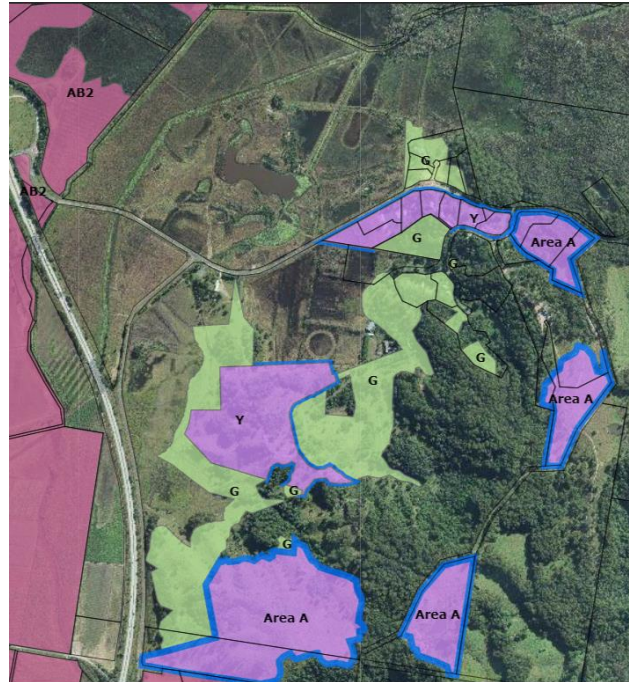


Fig. 33: Minimum Lot Size (LSZ 2014)

### 15.2.4. Floor Space Ratio (FSR 2014) (Fig. 34.)

Two categories of FSR of this proposed site has:

- E – 0.55
- T – 2

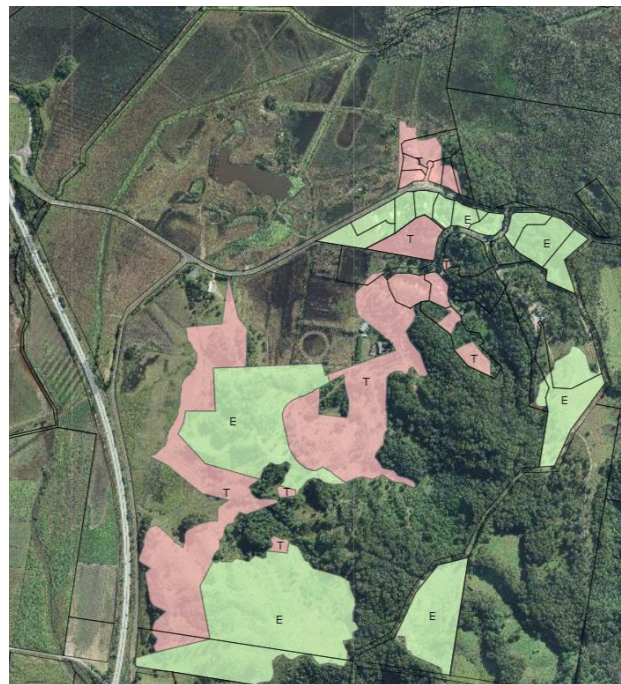


Fig. 34: Floor Space Ratio (FSR 2014)



#### 15.2.5. Acid Sulphate Soils (ASS 2014) (Fig. 35.)

Development consent is required for the carrying out of works on the Acid Sulphate Soils (ASS) with different requirements for different classifications. This site contains two classes of ASS:

- Class 2 – Works below the natural ground surface and/or works by which the water table is likely to be lowered.
- Class 5 – Works within 500 metres of adjacent Class 1, 2, 3, or 4 land that is below 5 metres Australian Height Datum (AHD) and by which the water table is likely to be lowered below 1 metre AHD on adjacent Class 1, 2, 3 or 4 land.



Fig. 35: Acid Sulphate Soils (ASS 2014)

#### 15.2.6. Heritage Items (HER 2014) (Fig. 36)

This site will need a comprehensive heritage assessment. There is a large area adjacent to the site which has heritage significance defined as “Archaeological Items”.

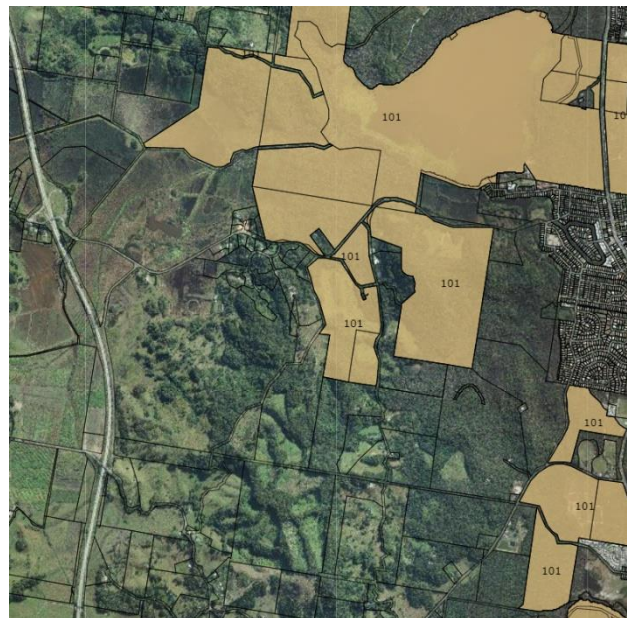


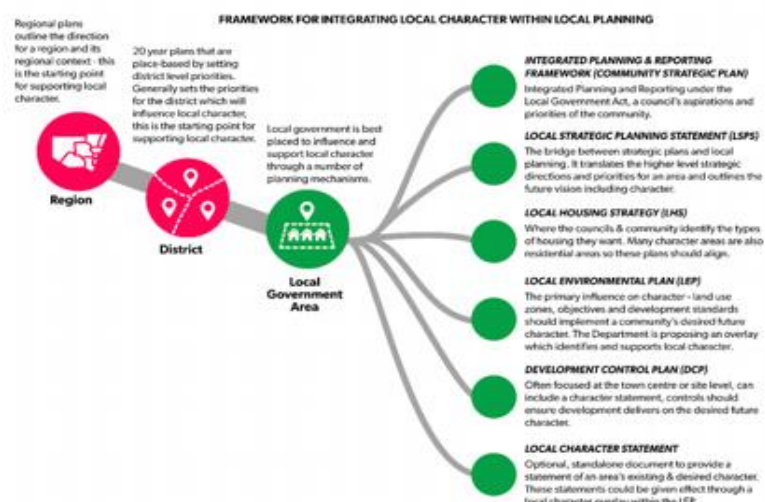
Fig. 36: Heritage Items (HER 2014)

### 15.3.ZONING

The estate is made up of four different zoning types: RU5 – Village Centre, R5 - Large Lot Residential, RE2 – Private Recreation, DM – Deferred Matter, and Environmental Protection Wetlands and Rainforest. The current and use zones are not well aligned with the strategic intent of State Government or the optimisation of increased profit for a private development company seeking to maximise the development yield. For these reasons it is proposed a Planning Proposal of a master planned community be undertaken where new land use allocations are applied in a scientific and rational manner.

### 15.4.NSW LOCAL CHARACTER AND PLACE GUIDELINE

One of the objectives of undertaking a character assessment of this location is to ensure that visual amenity such as landscape aesthetics are considered within the master planning process. To help articulate the sense of what makes a neighbourhood distinctive by the way it looks and feels. Combining the built environment, land, people, history and culture, creates a place's local character. It is a way that differentiates one area from another. Local character is important because it has a positive effect on liveability by promoting a sense of belonging.



**Fig. 37:** A framework for integrating local character within local planning (NSW Department of Planning)

Making great liveable places for people can be achieved by supporting local character through planning. The NSW Government has considered including the local character in its planning decision-making. NSW is facing social, demographic and economic changes that all have an impact on the character of a place and require a strategic planning focus. The aim of the strategic planning is to help the NSW Government work with communities to create liveable areas, where there is an efficient collaboration between the community and the local and state governments to protect the community's values and meet their aspirations while planning for the growing population. NSW's local character guideline (Figure 37 and 38) aims to support a stronger consideration of local character regardless of the nature of change.



**Fig. 38:** Who shapes local character? (NSW Department of Planning)



Greenfield development site such as this one can undergo substantial changes to the landscape as they are re-zoned from current agricultural settings to a residential, commercial or industrial estate. To achieve successful place making and viable economic activity it is recommended that place based planning include a wide variety of land use types such as inclusion of a different dwelling sizes, industrial areas, shopping amenities and community activities that will attract people to the area. Greenfield sites need specific attention to create a unique character that reflects the landscape and physical form of the site, as they do not have a pre-existing built environment. Strategic visioning is one of the ways mentioned in NSW local character and place guideline to create a strong sense of character in newly development communities. Figure 39 identifies the social, environmental and economic features that determine the local character of places.

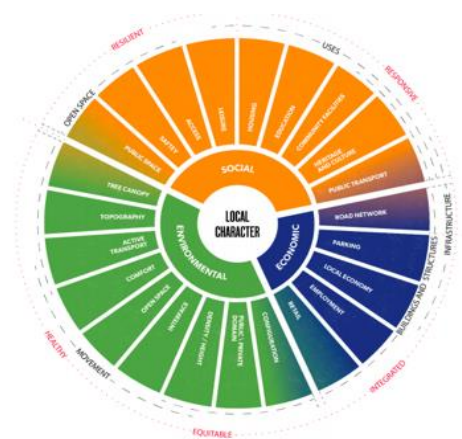


Fig. 39: Local character wheel (NSW Department of Planning)

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